



National Aeronautics and
Space Administration

**NSTS 07700,
VOLUME IV - BOOK 1
REVISION K
MAY 21, 1998**

Lyndon B. Johnson Space Center
Houston, Texas 77058

**REPLACES
NSTS 07700, VOLUME IV
REVISION J**

SPACE SHUTTLE

**CONFIGURATION MANAGEMENT
REQUIREMENTS**

BOOK 1

REQUIREMENTS

PROGRAM DEFINITION AND REQUIREMENTS

REVISION LOG

REV LTR	CHANGE NO	DESCRIPTION	DATE
		BASELINE ISSUE (Reference: PRCBD SS00024, dated)	03/02/73
A	2	REVISION A (Reference: PRCBD 00117, dated 2/8/74) also includes PRCBDs 00105, 00184, 00189, 00199, 00215, 00216, SRR RIDs and Change 1.	02/08/74
B	18	REVISION B (Reference: Level II PRCBD S03750, dated 5/10/77) also includes PRCBDs S02737B, S02757A, S03461, S03504, and Changes 3 thru 17.	05/16/77
C	63	REVISION C (Reference: Level II PRCBD S40129, dated 7/23/86) also includes Changes 19 thru 62.	08/19/86
D	67	REVISION D (Reference: Level II PRCBD S00024A, dated 1/21/88) also includes S40019R3, S40349C, S40465R3, S40702, S40743, S40817, S40936A, S93455, Errata and Changes 64 thru 66.	03/18/88
E	100	REVISION E (Reference: Level II PRCBD S071024B, dated 10/21/91) also includes S011543W, S011548P, S052082B, S052152H, S052212R2, S052309A, S052367AR1, S052416C, S052428AR1, S052448, S052448AR1, S052486, S052527, S061024W, S061544GR1, S063112ER8, S063112Q, S063112W, S071024A, S071024D, S071024E, S071024J, S081537DR1, S084291, S086053, S086055AR1, S086109, S094582B and Changes 68 thru 99.	10/21/91
F	103	REVISION F (Reference: SSP DOC-009, dated 5/26/92) also includes S011550JR6, S041880B, S052230A, S052592, S052601, S052612, S052675, S052675B, S052675C, S052675D, S061549K, S061549N, S061550J, S071024NR1, S071024W, S084604A and Changes 101 thru 102.	05/15/92
G	129	REVISION G (Reference: Space Shuttle PRCBD S071024BH, dated 8/2/94) also includes S011564H, S011566BR11, S052309B, S060471A, S063122H, S063122J, S063122K, S071024BC, S071024BK, S071024BP, S096052, SSP DOC-224 and Changes 104 thru 128.	11/23/94

REVISION LOG - Concluded

REV LTR	CHANGE NO	DESCRIPTION	DATE
H	134	REVISION H (Reference: Space Shuttle PRCBD S071024CG, dated 9/14/95) also includes PRCBDs S060636, S060640, S060657, S060657A, S060659, S071024CB, S071024CD, SSP DOC-271 and Changes 130 thru 133.	09/28/95
J	145	REVISION J (Reference: Space Shuttle PRCBD S071024DK, dated 10/30/96) also includes PRCBDs S011579BR10, S011580BR6, S011580BR9, S041516E, S052333CG, S052922YWR1, S071024DC, S071024DD, S071024DH, S071024DJ, S071024DM, CAR S052333CG, CAR S071024DC, SSP DOC-271, SSP DOC-307, SSP DOC-314, SSP DOC-316, SSP DOC-325 and Changes 135 thru 144.	01/07/97
K	164	REVISION K (Reference: Space Shuttle PRCBD S071024EZ, dated 3/23/98) also includes PRCBDs S011590CR7, S011591AR15, S011591AR18, S011591AR19, S011595CR1, S071024FA, SSP DOC-394 and Changes 146 thru 163.	05/21/98

CHANGE SHEET
FOR
PROGRAM DEFINITION AND REQUIREMENTS
VOLUME IV - Space Shuttle
Configuration Management Requirements
BOOK 1
REQUIREMENTS

CHANGE NO. 201

Program Requirements Control Board Directive Nos. S002130M/(2-1), dated 4/26/01; S061663/(2-1), dated 5/11/01; S071024HY/(1-1), dated 5/2/01; S071886Y/(2-1), dated 5/18/01; S087645E/(2-1), dated 5/11/01 and S092395C/(2-1), dated 5/3/01.(6)

May 21, 2001

Robert H. Heselmeyer
Secretary, Program Requirements
Control Board

CHANGE INSTRUCTIONS

1. Remove the following listed pages and replace with the same numbered attached pages:

<u>Page</u>	<u>PRCBD No.</u>
2-24C	S061663
2-24D	S061663, S071886Y, S087645E, S092395C
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NOTE: A black bar in the margin indicates the information that was changed.

2. Remove the List of Effective Pages, dated April 18, 2001 and replace with List of Effective Pages, dated May 21, 2001
3. Sign and date this page in the space provided below to show that these changes have been incorporated and file immediately behind the List of Effective Pages.

Signature of person incorporating changes

Date

PROGRAM DEFINITION AND REQUIREMENTS
VOLUME IV - Space Shuttle
Configuration Management Requirements
BOOK 1
REQUIREMENTS

*REVISION K (Reference PRCBD Nos. S011590CR7, dated 4/16/98; S011591AR15, dated 4/8/98; S011591AR18, dated 4/29/98; S011591AR19, dated 4/30/98; S011595CR1, dated 5/1/98; S071024EZ, dated 3/23/98; S071024FA, dated 4/8/98 and SSP DOC-394).

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The current status of all pages in this document is as shown below:

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vi	188	S071024HE	June 1, 2000
vii	Rev. K	*	May 21, 1998
viii	189	SSP DOC-468	July 3, 2000
ix	Rev. K	*	May 21, 1998
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2-8	196	S071024GA	December 1, 2000
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2-11	194	S052189DB	October 11, 2000
2-12 - 2-13	198	S061508	January 26, 2001
2-14	165	S052550JP	May 15, 1998
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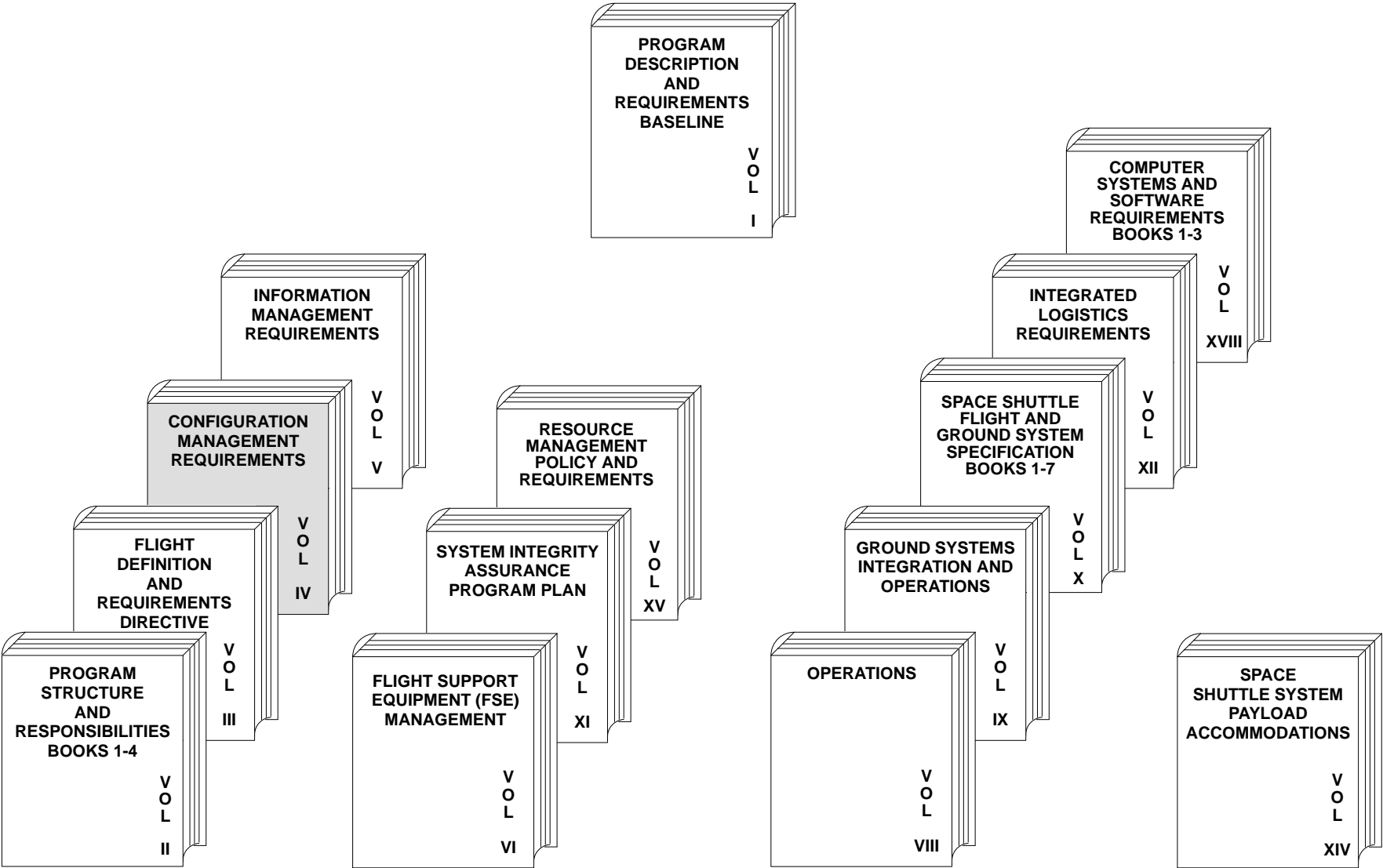
**NSTS 07700,
VOLUME IV - BOOK 1**

SPACE SHUTTLE

**CONFIGURATION MANAGEMENT
REQUIREMENTS**

**BOOK 1
REQUIREMENTS**

SPACE SHUTTLE
PROGRAM DEFINITION AND REQUIREMENTS - NSTS 07700



MANAGEMENT
REQUIREMENTS

TECHNICAL
REQUIREMENTS

NOTE: THE FOLLOWING VOLUME NUMBERS ARE
RESERVED: XVII
RETIRED: II-BKS 1 & 4; VI-BK 2; VII;
X-BKS 5 & 7; XIII; XVI

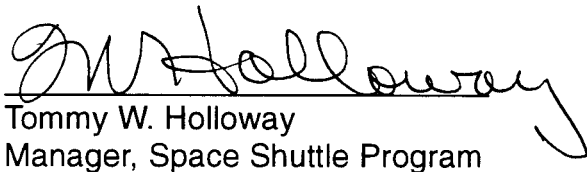
FOREWORD

Efficient management of the Space Shuttle Program (SSP) dictates that effective control of program activities be established. Requirements, directives, procedures, interface agreements, and system capabilities shall be documented, baselined, and subsequently controlled by SSP management.

Program requirements, directives, procedures, etc., controlled by the Manager, Space Shuttle Program, are documented in the volumes of this document, NSTS 07700. The accompanying illustration identifies the volumes that make up the Space Shuttle Program Definition and Requirements. Volume I contains overall descriptions of the NSTS 07700 documentation. Requirements to be controlled by the NASA project managers are to be identified, documented, and controlled by the project.

Book 1, Requirements, is one of two books currently in the NSTS 07700 Volume IV structure. This Book 1 defines the configuration management requirements, responsibilities, and procedures for the SSP. Volume IV - Book 1 also defines the requirements for documenting the specific configuration of Space Shuttle flight and ground systems hardware, software, approved open work, and retrofits/modifications. All NASA, USAF/DOD, and Contractor organizations involved in the SSP will accomplish their configuration management activities in accordance with the requirements contained herein. The Office of Primary Responsibility (OPR) for Volume IV - Book 1, is the Management Integration Office.

All elements of the SSP must adhere to these baselined requirements. When it is considered by the Space Shuttle Program element/project managers to be in the best interest of the SSP to change, waive or deviate from these requirements, an SSP Change Request (CR) shall be submitted to the Program Requirements Control Board (PRCB) Secretary. The CR must include a complete description of the change, waiver or deviation and the rationale to justify its consideration. All such requests will be processed in accordance with NSTS 07700, Volume IV - Book 1, and dispositioned by the Manager, Space Shuttle Program, on a Space Shuttle PRCB Directive (PRCBD).



Tommy W. Holloway
Manager, Space Shuttle Program

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1.0 INTRODUCTION

1.1 PURPOSE

This document defines the requirements, responsibilities, and procedures for all Space Shuttle Program (SSP) elements/projects in the application of Configuration Management (CM) on the SSP.

All program level CM requirements for the SSP are contained herein. In the event of conflicting statements regarding CM requirements between this volume and any other SSP document, the requirement of this document shall take precedence. However, if a Program Directive (PD) has been subsequently issued by the Manager, Space Shuttle Program, which affects the statement(s) in question, the PD shall take precedence.

1.2 SCOPE

This document has been jointly developed by the NASA centers, and represents a careful application of the experience gained in previous NASA, military, and commercial space and aircraft programs. The requirements, responsibilities, and procedures defined herein are applicable to all organizations and personnel involved in the SSP. This volume also defines those requirements, responsibilities, and procedures applicable to contractor activities necessary to achieving total program CM objectives.

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2.0 APPLICABLE DOCUMENTS

The following documents of the date and issue shown form a part of this document to the extent specified herein. “(Current Issue)” is shown in place of the specific date and issue when the document is under Space Shuttle PRCB control. The current status of documents shown with “(Current Issue)” may be determined from NSTS 08102, Program Document Description and Status Report.

NSTS 07700
Volumes I - XVIII
(Current Issue)

Space Shuttle Program Definition and Requirements

Ref. Para. 3.1.6, Fig. 3-1

NSTS 07700
Volume I
(Current Issue)

Program Description and Requirements Baseline

Ref. Para. 3.1.6, Apx. F

NSTS 07700
Volume II - Book 2
(Current Issue)

Program Structure and Responsibilities, Space Shuttle Program Directives

Ref. Para. 4.3.2.1.1, 4.3.2.2.3.1, 4.3.2.3.4.1, Apx. F

NSTS 07700
Volume II - Book 3
(Current Issue)

Program Structure and Responsibilities, Space Shuttle Program Interface Agreements

Ref. Para. 4.3.5.1.1, 4.3.5.2.1, Apx. F

NSTS 07700
Volume III
(Current Issue)

Flight Definition and Requirements Directive

Ref. Para. 3.1.1, 4.2.6, 4.3.2.2.1, 4.4.14, Apx. F

NSTS 07700
Volume V
(Current Issue)

Information Management Requirements

Ref. Para. 3.1.11, 4.3.2.1.1, 7.4.3; Apx. E, Apx. F,
Apx. M

NSTS 07700
Volume VI
(Current Issue)

Flight Support Equipment (FSE) Management

Ref. Para. 4.3.2.1.1, Apx. F

NSTS 07700
Volume VIII
(Current Issue)

Operations

Ref. Para. 4.3.4.1.1, 4.3.4.1.2, 6.1.10.1, 6.1.10.2,
Apx. F

NSTS 07700
Volume IX
(Current Issue)

Ground Systems Integration and Operations

Ref. Apx. F

NSTS 07700
Volume X
(Current Issue)

Flight and Ground System Specification

Ref. Para. 4.2, 6.1.7.1, 7.4.2, Fig. 3-2, Apx. F

NSTS 07700
Volume X - Book 1
(Current Issue)

Flight and Ground System Specification,
Requirements

Ref. Para. 4.1.1.1, 4.1.1.2, 4.2, 4.3.2.1.1,
4.3.2.3.3.1, 4.3.2.3.5.1, 4.3.2.9.1, 4.3.2.9.1.3,
4.3.2.10.2, 4.3.2.11.1, 4.3.3, 4.3.3.3.1, 4.4.1.1,
4.4.9, 4.4.13.6.1, 7.4.1, Apx. B, Apx. F, Apx. V,
Apx. Z

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Volume X - Book 2
(Current Issue)

Flight and Ground System Specification,
Environment Design, Weight and Performance,
and Avionics Events

Ref. Apx. F

NSTS 07700
Volume X - Book 3
(Current Issue)

Flight and Ground System Specification,
Requirements for Runways and Navigation Aids

Ref. Apx. F

NSTS 07700
Volume X - Book 4
(Current Issue)

Flight and Ground System Specification,
Active Deviations/Waivers

Ref. Apx. F

NSTS 07700
Volume X - Book 6
(Current Issue)

Flight and Ground System Specification,
Retired Deviations/Waivers

Ref. Apx. F

NSTS 07700
Volume XI
(Current Issue)

System Integrity Assurance Program Plan

Ref. Para. 4.2.6, 4.3.2.3.3.1, 6.2, Apx. F

NSTS 07700
Volume XII
(Current Issue)

Integrated Logistics Requirements

Ref. Apx. F

NSTS 07700
Volume XIV
(Current Issue)

System Payload Accommodations

Ref. Para. 4.3.2.2.1, 4.3.2.2.3.2, 4.3.5.2.1, Apx. F,
Apx. G

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Volume XIV
Appendix 1
(Current Issue)

Contamination Environment

Ref. Apx. F

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Appendix 2
(Current Issue)

Thermal

Ref. Apx. F

NSTS 07700
Volume XIV
Appendix 3
(Current Issue)

Electrical Power and Avionics

Ref. Apx. F

NSTS 07700
Volume XIV
Appendix 4
(Current Issue)

Structures and Mechanics

Ref. Apx. F

NSTS 07700
Volume XIV
Appendix 5
(Current Issue)

Ground Operations

Ref. Apx. F

NSTS 07700
Volume XIV
Appendix 6
(Current Issue)

Mission Planning and Design

Ref. Apx. F

NSTS 07700
Volume XIV
Appendix 7
(Current Issue)

Extravehicular Activities

Ref. Apx. F

NSTS 07700
Volume XIV
Appendix 8
(Current Issue)

Payload Deployment and Retrieval System

Ref. Apx. F

NSTS 07700
Volume XIV
Appendix 9
(Current Issue)

Intravehicular Activities

Ref. Apx. F

NSTS 07700
Volume XIV
Appendix 10
(Current Issue)

Integration Hardware

Ref. Apx. F

NSTS 07700
Volume XV
(Current Issue)

Resource Management Policy and Requirements

Ref. Apx. F

NSTS 07700
Volume XVIII - Book 1
(Current Issue)

Computer Systems and Software Requirements,
Allocation of Computational Functions

Ref. Apx. F

NSTS 07700
Volume XVIII - Book 2
(Current Issue)

Computer Systems and Software Requirements,
Allocation of Simulation Functions

Ref. Para. 5.6, Apx. F

NSTS 07700
Volume XVIII - Book 3
(Current Issue)

Computer Systems and Software Requirements,
Software Management and Control

Ref. Para. 5.6, Apx. F

NSTS 07700-10-
MVP-01
(Current Issue)

Shuttle Master Verification Plan, Volume I,
General Approach and Guidelines

Ref. Para. 6.1.7.1, Apx. F

NSTS 07700-10-
MVP-02
(Current Issue)

Shuttle Master Verification Plan, Volume II,
Combined Element Verification Plan

Ref. Apx. F

NSTS 07700-10-
MVP-09, Part 1
(Current Issue)

Shuttle Master Verification Plan, Volume IX,
Computer Systems and Software Verification Plan,
Part 1, Guidelines and Standards

Ref. Apx. F

NSTS 07700-10-
MVP-09, Part 2
(Current Issue)

Shuttle Master Verification Plan, Volume IX,
Computer Systems and Software Verification Plan,
Part 2, Verification Requirements

Ref. Apx. F

NSTS 1700.7B

Safety Policy and Requirements for Payloads
Using the Space Transportation System

Ref. Para. 4.3.2.2.1, Apx. F

NSTS 1700.7B
Addendum

Safety Policy and Requirements for Payloads
Using the International Space Station (ISS
Addendum)

Ref. Apx. F

NSTS 5300.4(1D-2)
(Current Issue)

Safety, Reliability, Maintainability and Quality
Provisions for the Space Shuttle Program

Ref. Para. 4.1.1.2, 4.3.2.2.3.2, 4.3.2.9.1, Apx. E,
Apx. F, Apx. Z

NSTS 07636
(Current Issue)

Lightning Protection, Test and Analysis
Requirements

Ref. Apx. F

NSTS 08060
(Current Issue)

System Pyrotechnic Specification

Ref. Apx. F

NSTS 08080-1
(Current Issue)

Manned Spacecraft Criteria and Standards

Ref. Para. 4.4.9, Apx. F

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Ref. Apx. F

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(Current Issue)

Requirements for Periodic Certification of Material
Handling Equipment and Operating Personnel

Ref. Apx. F

NSTS 08117 (Current Issue)	Requirements and Procedures for Certification of Flight Readiness Ref. Para. 4.2.6, 4.4.15, 6.1.9, 6.1.10.1, Apx. F
NSTS 08123 (Current Issue)	Certification of Flexhoses and Bellows for Flow Induced Vibration Ref. Apx. F
NSTS 08126 (Current Issue)	Problem Reporting and Corrective Action (PRACA) System Requirements Ref. Para. 4.3.2.9.1.1, 4.4.9.3, Apx. F
NSTS 08131 (Current Issue)	Contamination Control Plan Ref. Apx. F
NSTS 08151 (Current Issue)	Intermediate and Depot Maintenance Requirements Document (IDMRD) Ref. Para. 4.1.1.2, Apx. Q
NSTS 08151 Volume I (Current Issue)	Intermediate and Depot Maintenance Requirements Document (IDMRD), Maintenance Concepts Baseline Ref. Apx. F
NSTS 08151 Volume II	Intermediate and Depot Maintenance Requirements Document (IDMRD) Ref. Apx. F
NSTS 08151 Volume III	Intermediate and Depot Maintenance Requirements Document Ref. Apx. F

NSTS 08170
(Current Issue)

Subsystem Codes

Ref. Apx. F, Apx. P

NSTS 08171

Operations and Maintenance Requirements
and Specifications Document (OMRSD)

Ref. Para. 4.1.1.2, 4.3.2.1.1, 4.4.13.6.1; Apx. C,
Apx. P

NSTS 08171
File I

Operations and Maintenance Requirements
and Specifications Document, Introduction

Ref. Apx. F

NSTS 08171
File II

Operations and Maintenance Requirements and
Specifications Document, Integrated (OMRSD)

Ref. Para. 4.3.2.1.1, 4.4.9, Apx. F

NSTS 08171
File III

Operations and Maintenance Requirements and
Specifications Document, Orbiter and SSME

Ref. Para. 4.3.2.1.1, 4.4.9, Apx. F

NSTS 08171
File IV

Operations and Maintenance Requirements and
Specifications Document, External Tank

Ref. Apx. F

NSTS 08171
File V

Operations and Maintenance Requirements and
Specifications Document, Solid Rocket Booster

Ref. Apx. F

NSTS 08171 File VI	Operations and Maintenance Requirements and Specifications Document, KSC Ground Support Equipment Ref. Apx. F
NSTS 08171 File VII	Operations and Maintenance Requirements and Specifications Document, Spacelab MMSC Stand Alone File Ref. Para. 4.3.2.1.1, Apx. F
NSTS 08171 File VIII	Operations and Maintenance Requirements and Specifications Document, Non-Spacelab Shuttle Payloads Ref. Para. 4.3.2.1.1, Apx. F
NSTS 08171 File IX	Operations and Maintenance Requirements and Specifications Document, Flight Data Collections and Analysis Requirements Ref. Para. 4.3.2.1.1, 4.4.9, Apx. F
NSTS 08171 File X	Operations and Maintenance Requirements and Specifications Document, International Space Station (ISS) OMRSD Ref. Para. 4.3.2.1.1d, Apx. F
NSTS 08192	Math Models of Friction Characteristics for Orbiter Main and Nose Gear Tires Ref. Apx. F
NSTS 08198 (Current Issue)	Safety and Obsolescence (S&O) Vulnerability Assessment Methodology Ref. Apx. F

NSTS 08203
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Technical Operating Procedures (TOPs) Review
Implementation Plan

Ref. Apx. F

NSTS 08209
Volumes I - V and VII
(Current Issue)

Shuttle Systems Design Criteria

Ref. Para. 4.3.2.2.1

NSTS 08209
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(Current Issue)

Shuttle Systems Design Criteria, Shuttle
Performance Assessment Data Book

Ref. Apx. F

NSTS 08209
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(Current Issue)

Shuttle Systems Design Criteria, Integrated
Vehicle Baseline Characterization (IVBC-3)

Ref. Apx. F

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Volume III
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Shuttle Systems Design Criteria, Systems and
Environmental Dispersions

Ref. Apx. F

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Shuttle Systems Design Criteria, Generic Ascent
Flight Design Requirements

Ref. Apx. F

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(Current Issue)

Shuttle Systems Design Criteria, Performance
Enhancement Systems Certification Summary
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Intercenter Photographic and Television Analysis
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Television Plan

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NSTS 08242
(Current Issue)

Limitations for Non-Flight Materials and Equipment
Used in and Around the Space Shuttle Orbiter
Vehicles

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Program Launch and Landing Photographic
Engineering Evaluation

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NSTS 08271
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Flight and Ground Software Verification and
Validation Requirements

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Ice/Debris Inspection Criteria

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NSTS 08307
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Criteria for Preloaded Bolts

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NSTS 08318
(Current Issue)

Hydraulic System Exceptions to MIL-H-5440

Ref. Apx. F

NSTS 08329
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(Current Issue)

DOLILU II Definition and Requirements Document,
DOLILU II Quality Assurance Rules

Ref. Para 4.3.2.2.1h, Apx. F

NSTS 08329
Volume VIII
(Current Issue)

DOLILU II Definition and Requirements Document,
DOLILU Operations Support Plan

Ref. Para 4.3.2.2.1h, Apx. F

NSTS 08338

Orbiter Avionics Mass Memory Unit Computer
Program Integration Plan

Ref. Para. 4.3.2.3.3.1, Fig. 3-4-1, Apx. M

NSTS 08338
Volume I

Orbiter Avionics Mass Memory Unit Computer
Program Integration Plan Release Control

Ref. Apx. F

NSTS 08338
Volume II

Orbiter Avionics Mass Memory Unit Computer
Program Integration Plan Release Authority and
Schedules

Ref. Apx. F

NSTS 08338 Volume III	Orbiter Avionics Mass Memory Unit Computer Program Integration Plan Deliverable Requirements and Tape Formats	
	Ref. Apx. F	
NSTS 08347	Contingency Abort Data Book	
	Ref. Apx. F	
NSTS 08349 (Current Issue)	System Integration Plan for Integrated Mission Support Plan	
	Ref. Apx. F	
NSTS 08399	Space Shuttle Program (SSP) Critical Items List (CIL)	
	Ref. Apx. C, Apx. F	
NSTS 08934 Volume I	Space Shuttle Operational Data Book, Shuttle Systems Performance and Constraints Data	
	Ref. Para. 4.3.2.1.1, Apx. F	I
NSTS 08934 Volume II	Space Shuttle Operational Data Book, Mission Mass Properties	
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NSTS 08934 Volume III	Space Shuttle Operational Data Book, Shuttle Systems Analysis Data	
	Ref. Para. 4.3.2.1.1, Apx. F	I
NSTS 08934 Volume IV	Space Shuttle Operational Data Book, Orbiter Landing Emergency Rescue Data	
	Ref. Para. 4.3.2.1.1, Apx. F	I

NSTS 08934 Volume V	Space Shuttle Operational Data Book, Orbiter Flight Capability Envelopes	
	Ref. Para. 4.3.2.1.1, Apx. F	
NSTS 08934 Volume VI	Space Shuttle Operational Data Book, Orbiter Propellant Dump Reference Data	
	Ref. Para. 4.3.2.1.1, Apx. F	
NSTS 08934 Volume VII	Space Shuttle Operational Data Book, Orbiter Ascent Structural Envelopes	
	Ref. Para. 4.3.2.1.1; Apx. F	
JSC 08969	Crew Procedures Management Plan	
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NSTS 09095	Space Shuttle Systems Weight and Performance Status Report	
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NSTS 10658	Shuttle Avionics Integration Laboratory, SAIL/ MMES Requirements Document	
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NSTS 12820

STS Operational Flight Rules
(Previously JSC 12820)

Ref. Apx. F

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NSTS/ISS 13830	Payload Safety Review and Data Submittal Requirements for Payloads Using the Space Shuttle and International Space Station	
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NSTS 14019	Tracking and Data Relay Satellite (TDRS)	
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NSTS 14046	Payload Verification Requirements	
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NSTS 16007 (Current Issue)	Shuttle Launch Commit Criteria and Background Document	
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NSTS 16725	Flight Tests and Supplementary Objectives Document	
	Ref. Apx. F	
NSTS 16979	Shuttle Orbiter Failure Modes and Effects Associated with Standard Cargo Interfaces	
	Ref. Apx. F	
NSTS 17462 Blank Book	Flight Requirements Document	
	Ref. Apx. F	
NSTS 17462	STS-XX Flight Requirements Document	
	Ref. Para. 4.2.6, Apx. F	

NSTS 17462B	STS-XX Plug-in Plan for Flight Requirements Document	
	Ref. Apx. F	
NSTS 17462-PRM	Flight Requirements Document ISSA Performance Reference Mission	
	Ref. Apx. F	
JSC 17481	JSC Safety Requirements Document for Space Shuttle Flight Equipment	
	Ref. Para. 4.3.2.2.3.2	
JSC 18206	Shuttle Data Integration Plan	
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NSTS 21000-A01	Data Requirements for the Payload Data Package, Annex No. 1	
	Ref. Apx. F	
NSTS 21000-A02	Data Requirements for the Flight Planning Annex, Annex No. 2	
	Ref. Apx. F	

NSTS 21000-A04	Standard Integration Plan Annex No. 4, Command and Data Requirements (Previously JSC 14093) Ref. Apx. F, Apx. P
NSTS 21000-A05	Data Requirements for the Payload Operations Control Center Annex, MCC/JSC/POCC Remote POCC Interface Requirements Ref. Apx. F
NSTS 21000-A06	Data Requirements for the Orbiter Crew Compartment Annex Ref. Apx. F
NSTS 21000-A07	Training Annex Data Requirements Ref. Apx. F
NSTS 21000-A11	Data Requirements for the Extravehicular Activity Annex Ref. Apx. F
NSTS 21000-ICA	Standard Orbiter Crew Compartment Interface Control Annex Ref. Apx. F
NSTS 21000-IDD-ISS	International Space Station Interface Definition Document Ref. Para. 4.3.5.2.1, Apx. F

NSTS 21000-IDD-MDK	Shuttle/Payload Interface Definition Document for Middeck Accommodations Ref. Apx. F
NSTS 21000-IDD-486	Shuttle/Payload Interface Definition Document for the Payload and General Support Computer (PGSC) Ref. Para. 4.3.2.3.4.1.1, Apx. F
NSTS 21000-IDD-SML	Shuttle/Payload Interface Definition Document for Small Payload Accommodations Ref. Apx. F
NSTS 21000-SIP-ATT	Shuttle/Payload Standard Integration Plan for Attached Payloads Ref. Apx. F
NSTS 21000-SIP-DRP	Shuttle/Payload Standard Integration Plan for Deployable/Retrievable-Type Payloads Ref. Apx. F
NSTS 21000-SIP-GAS	Shuttle/Payload Standard Integration Plan for Get Away Special Payloads Ref. Apx. F

NSTS 21000-SIP-MDK	Shuttle/Payload Standard Integration Plan for Middeck-Type Payload
	Ref. Apx. F
NSTS 21000-SIP-MIP (ISSA)	Space Station Mission Integration Plan for the Mission (STS-XX)
	Ref. Apx. F
NSTS 21000-SIP-NDD	Standard Integration Plan for Nonstandard Development Test Objective/Detailed Supplementary Objective or Risk Mitigation Experiment
	Ref. Apx. F
NSTS 21075	Space Shuttle Operational Flight Design Standard Groundrules and Constraints
	Ref. Para. 4.3.2.2.1, Apx. F
NSTS 21111 (Current Issue)	Generic Integrated Cargo Hazard Assessment Report
	Ref. Apx. F

NSTS 21288	Required Data/Guidelines for Payload/Shuttle Electromagnetic Compatibility Analysis
	Ref. Apx. F
NSTS 21306 (Current Issue)	Project Management Plan for the Androgynous Peripheral Docking System and Associated Docking Targets
	Ref. Apx. F
NSTS 21311	Space Shuttle Program/International Space Station Program Joint Integration Schedule (SSP/ISSP JIS)
	Ref. Apx. F
NSTS 22206 (Current Issue)	Requirements for Preparation and Approval of Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL)
	Ref. Para. 4.3.2.1.1, 4.3.2.2.3.2, 4.4.9, Apx. F

NSTS 22254 (Current Issue)	Methodology for Conduct of Space Shuttle Program Hazard Analyses Ref. Para. 4.3.2.1.1, 4.3.2.2.3.2, Apx. F
JSC 22320	Class I Integration Plan (CIP) Ref. Apx. M
NSTS 22579	NSTS Safety, Reliability and Quality Assurance Survey Program Plan Ref. Apx. F
NSTS 22648	Guidelines for Flammability Configuration Analysis for Spacecraft Application Ref. Apx. F
JSC 23540	Program Requirements Document (PRD) Guidelines Ref. Para. 4.3.2.1.1, 4.3.2.2.3.2
JSC 26287	Project Management Plan (PMP) Guideline Ref. Para. 4.3.2.1.1
JSC 27891	Shuttle/Payload Configuration Management Plan for the Payload and General Support Computer (PGSC) Ref. Para. 4.3.2.3.4.1, 4.3.2.3.4.1.1, Apx. F
JSC 28035 (Current Issue)	Program Problem Reporting and Corrective Action Requirements for Johnson Space Center Government Furnished Equipment Ref. Apx. F

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JSC 28737	Program Requirements Document Integrated Propellant Transfer System (IPTS) Ref. Table F.1
NSTS 37308 (Current Issue)	System Integration Plan for Space Shuttle Main Engine Block II Configuration Ref. Apx. F
NSTS 37310 (Current Issue)	Space Shuttle Program Safety Risk Ranking Methodology Ref. Apx. F
NSTS 37326	Shuttle Crew Scheduling Constraints Ref. 4.3.2.2.1
NSTS 37328 (Current Issue)	Mishap Investigation Team Fieldbook Ref. Table F.1
NSTS 37329	Structural Integration Analyses Responsibility Definition for Space Shuttle Vehicle and Cargo Element Developers Ref. Apx. F
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NSTS 37333	The Electromagnetic Compatibility Frequency Analysis Computer Program EMCFAB1
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NSTS 37334	Electromagnetic Compatibility Frequency Analysis Computer Program Desk Instructions
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NSTS 37337 (Current Issue)	Orbiter System Requirements Document for the Multipurpose Logistics Module (MPLM) Cooling System Modification
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NSTS 37341 (Current Issue)	Project Management Plan for the Electric Auxiliary Power Unit (EAPU)
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Shuttle Environmental Assurance Initiative
Program Plan

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Project Management Plan for the Cockpit Avionics
Upgrade

Ref. Table F.1

NSTS 37347
(Current Issue)

Cockpit Avionics Upgrade Program Requirements
Document

Ref. Table F.1

NSTS 37349
(Current Issue)

Long Life Alkaline Fuel Cell (LLAFC) Project
Management Plan

Ref. Table F.1

NSTS 37350
(Current Issue)

System Integration Plan for Flight Operations
Reinvention

Ref. Table F.1

NSTS 37351
(Current Issue)

System Requirements Document for Flight
Operations Reinvention

Ref. Table F.1

NSTS 37352
(Current Issue)

Program Requirements Document for Long
Life Alkaline Fuel Cell

Ref. Table F.1

NSTS 37358
(Current Issue)

Space Shuttle Program Process Control
Management Plan

Ref. Table F.1

NSTS 37364
(Current Issue)

Flight Operations Reinvention Integrated
Verification Plan

Ref. Table F.1

NSTS 37366
(Current Issue)

Shuttle Environmental Assurance (SEA)
Initiative Implementation Plan

Ref. Table F.1

NSTS 37367
(Current Issue)

Program Industrial Engineering for Safety Program
Management Plan

Ref. Apx. F

NSTS 37400
(Current Issue)

Space Shuttle Program Upgrades Management
Plan

Ref. Table F.1

NSTS 47000
(Current Issue)

Program Requirements Document for SSME
Advanced Health Management System (AHMS)
Phase I

Ref. Table F.1

NSTS 47001
(Current Issue)

SSME Advanced Health Management
System (AHMS) Project Management Plan

Ref. Table F.1

NSTS 47004
(Current Issue)

Project Management Plan for Friction Stir
Welding of External Tank Barrels

Ref. Table F.1

NSTS 47005
(Current Issue)

Program Requirements Document for Improved
Main Landing Gear Tire/Wheel

Ref. Table F.1

NSTS 47007
(Current Issue)

Program Requirements Document for SSME
Advanced Health Management System (AHMS)
Phase 2

Ref. Apx. F

NSTS 47008
(Current Issue)

Management Plan for Space Shuttle Upgrades
Program Integration

Ref. Table F.1

NSTS 47009
(Current Issue)

Program Requirements Document for
SRB Advanced (HEAPU) TVC Subsystem

Ref. Apx. F

NSTS 47012
(Current Issue)

Program Requirements Document for Friction Stir
Welding of External Tank Barrels

Ref. Apx. F

SSP 50021

International Space Station Program Safety
Requirements Document

Ref. Table F.1

JSC 61100

Project Management Plan (PMP) Guideline

Ref. Para. 4.3.2.1.1

DOD-D-1000B
October 28, 1977

Drawing, Engineering, and Associated Lists

Ref. Apx. E

DOD-STD-100D
April 3, 1987

Engineering Drawing Practices

Ref. Apx. E, Apx. Q

ICD-1-FDD-011

Flight Design and Dynamic Ascent Discipline,
Ascent Subsystem, Day-of-Launch Function

Ref. Apx. F

ICD-2-00001

Shuttle Vehicle Mold Lines and Protuberances
Interface Control Document

Ref. Apx. F

ICD-2-0A001

Shuttle System/Launch Platform Stacking and Vab
Servicing Interface Control Document

Ref. Apx. F

ICD-2-0A002

Shuttle System Launch Pad and Platform
Interfaces Interface Control Document

Ref. Apx. F

ICD-2-0A003

Flight Vehicle/LPS Computational Systems
Interface Control Document

Ref. Apx. F

ICD-2-0A004

Space Shuttle Systems/KSC RF Communications
and Tracking Checkout Interface Control Document

Ref. Apx. F

ICD-2-0D003

JSC/USAF Space Shuttle/SCF RF Communications
and Tracking Interface Control Document

Ref. Apx. F

ICD-2-0D004	JSC/GSFC Space Shuttle RF Communications and Tracking Interface Control Document Ref. Apx. F
ICD-2-0H001	Shuttle Vehicle/Ground Range Safety System Interface Control Document Ref. Apx. F
ICD-2-1A001	Orbiter/KSC Landing Station Interface Control Document Ref. Apx. F
ICD-2-1A002	Orbiter Processing Facility/Orbiter Maintenance and Checkout Facility Interface Control Document Ref. Apx. F
ICD-2-1A003	Orbiter/Hypergolic Station Interface Control Document Ref. Apx. F
ICD-2-1D003	Orbiter Secondary Landing/Safing and Deservicing Stations Interface Control Document Ref. Apx. F
ICD-2-1D004	Orbiter and Carrier Aircraft/Mate-Demate Interfaces Interface Control Document Ref. Apx. F
ICD-2-1S001	Orbiter Primary Flight Software/Backup Flight Software Interface Control Document Ref. Apx. F

ICD-2-1S002	Flight Computer IPL Package Ref. Apx. F
ICD-2-2A001	External Tank/Receiving, Storage and Checkout Station Interface Control Document Ref. Apx. F
ICD-2-4A001	Solid Rocket Booster/Receiving Processing Station Interface Control Document Ref. Apx. F
ICD-2-4A002	Solid Rocket Booster/Retrieval Station Interface Control Document Ref. Apx. F
ICD-2-12001	Orbiter Vehicle/External Tank Interface Control Document Ref. Apx. F
ICD-2-14001	Orbiter Vehicle/Solid Rocket Booster Interface Control Document Ref. Apx. F
ICD-2-17001	Orbiter/Carrier Aircraft Vehicle Interface Control Document Ref. Apx. F
ICD-2-19001	Shuttle Orbiter/Cargo Standard Interface Control Document Ref. Para. 4.3.2.2.1, Apx. F

ICD-2-24001	External Tank/Solid Rocket Booster Interface Control Document
	Ref. Apx. F
ICD-13M15000	Space Shuttle Orbiter Vehicle/Main Engine Interface Control Document
	Ref. Apx. F
JSCM 8080	JSC Design and Procedure Standards Manual
	Ref. Apx. C
K-DOD-SM02 October 20, 1983	John F. Kennedy Space Center Space Transportation System Security Requirement/Implementation Plan, Revision B
	Ref. Para. 4.3.3.10.2
MIL-D-1000B	Drawings, Engineering and Associated Lists
	Ref. Apx. E
MIL-Q-9858A December 16, 1963	Quality Program Requirements
	Ref. Apx. E
MIL-STD-483 December 31, 1970	Configuration Management Practices for Systems, Equipment, Munitions, and Computer Programs
	Ref. Apx. E
MIL-STD-490 October 30, 1968	Specification Practices
	Ref. Apx. E

MM 8040.12 July 28, 1971	Standard Contractor Configuration Management Requirements Ref. Apx. E
MV5-01	FCE Work Instruction on Design Control Ref. Para. 4.3.2.3.5.1
NHB 1440.4A July 1, 1968	Specifications and Standards for NASA Engineering Data Microreproduction Systems Ref. Apx. E
NHB 1700.7A December 9, 1980	Safety Policy and Requirements for Payloads Using the Space Transportation System Ref. Para. 4.3.2.2.1, Apx. F
SD72-SH-0060-2	Aerodynamic Design Data Book, Volume II, Mated Vehicle Ref. Apx. F
SD73-SH-0181	Space Shuttle Aerodynamic Heating Data Book Ref. Apx. F
SD74-SH-0082	Acoustics and Shock Data Book, Space Shuttle Systems Ref. Apx. F

SD74-SH-0129	Space Shuttle Flutter and Aeroelasticity Data Book Ref. Apx. F
SD74-SH-0144	Space Shuttle Program Thermal Interfaces Design Data Book Ref. Apx. F
SE-R-0006 (Current Issue)	General Specification Space Shuttle System Requirements for Materials and Processes Ref. Apx. F
SE-S-0073 (Current Issue)	Specification Fluid Procurement and Use Control Ref. Apx. F
SFOC-PM0062 PDP MS3-001	Product Development Plan for Payload Engineering Products Shuttle-to-Payload Interface Requirements PDP MS3-001 Ref. Para. 3.1.8, 4.4.3.2
SFOC-PM0063 PDP MS3-002	Product Development Plan for Reconfiguration Engineering PDP MS3-002 Ref. Para. 4.3.2.2.3.3
SFOC-PM0065 PDP MS3-007	Product Development Plan for Payload Engineering Products Payload Unique Interface PDP MS3-007 Ref. Para. 3.1.8, 4.4.3.2
SFOC-PM0092 PDP MS3-013	Product Development Plan for Space Shuttle Program System ICDs PDP MS3-013 Ref. Apx. D

SL-E-0001 (Current Issue)	Specification Electromagnetic Compatibility Requirement Ref. Apx. F
SL-E-0002 (Current Issue)	Specification Electromagnetic Interference Characteristics, Requirements for Equipment, Book 1 - Existing Hardware, Book 2 - New or Modified Hardware Ref. Apx. F
SL-T-0003 (Current Issue)	General Requirements for the Preparation of Space Shuttle Technical Manuals Ref. Apx. F
SL-T-0004 (Current Issue)	Preparation of Space Shuttle Organizational Operations and Maintenance Manuals Ref. Apx. F
SL-T-0005 (Current Issue)	Preparation of Space Shuttle Intermediate and Depot Maintenance Manuals Ref. Apx. F
SL-T-0006 (Current Issue)	Preparation of Space Shuttle Intermediate and Depot Level Maintenance Manuals (Engines) Ref. Apx. F
SL-T-0007 (Current Issue)	Preparation of Space Shuttle Illustrated Parts Breakdowns (IPBs) Ref. Apx. F

SL-T-0008 (Current Issue)	Preparation of Space Shuttle Work Unit Code Manuals Ref. Apx. F
SL-T-0010 (Current Issue)	Preparation of Time Compliance Technical Instructions Ref. Para. 4.4.5.1, 4.4.5.2.1, Apx. F
SL-T-0012 (Current Issue)	Preparation of Space Shuttle Nondestructive Inspection Manuals Ref. Apx. F
SL-T-0014 (Current Issue)	Preparation of Space Transportation System Mission Equipment End Item Data Packages Ref. Para. 7.4.3, Apx. F
SN-C-0005 (Current Issue)	Contamination Control Requirements Ref. Apx. F
SN-D-0007 (Current Issue)	Acceptance Data Package Requirements Ref. Para. 3.1.9, 6.1.8, 6.1.9, 7.4.4, Apx. F
SN-P-0006	Printed Wiring Board Multilayer, Plated through Hole, Design Specifications for Ref. Apx. F
SN-S-0008 (Current Issue)	Software Deliverable Data Package Requirements Specification Ref. Para. 3.1.9, 4.4.5.1, 4.4.5.2.1, 6.1.8, 6.1.8.1, 6.1.9; Apx. F, Apx. M, Apx. P

SP-T-0023
(Current Issue)

Specification Environmental Acceptance Testing

Ref. Apx. F

SSD90D0016

Space Shuttle Generic ETR Aerodynamic and
Plume Heating Data Book: Orbiter Ascent

Ref. Apx. F

SSD90D0106

Space Shuttle Generic ETR Plume Heating
Data Book: External Tank Ascent

Ref. Apx. F

SSD90D0159

Space Shuttle Generic ETR Aerodynamic Heating
Data Book: Solid Rocket Booster - Ascent

Ref. Apx. F

SSD90D0169

Space Shuttle Generic ETR Plume Heating Data
Book: Solid Rocket Booster - Ascent

Ref. Apx. F

SSD96D0007

Space Shuttle Generic Certification SSME Nozzle
Entry Aeroheating Data Book

Ref. Apx. F

STS84-0258

IVBC-3 External Tank Plume Heating Data Book

Ref. Apx. F

STS84-0462

Space Shuttle IVBC-3 Aerodynamic Heating Data
Book - External Tank Ascent (Books I - III)

Ref. Apx. F

STS84-0615

IVBC-3 SSME (Nozzle) Plume Heating Data Book

Ref. Apx. F

STS84-0616	IVBC-3 Orbiter Plume Heating Data Book (Books I, II) Ref. Apx. F
STS84-0666	Space Shuttle IVBC-3 Aerodynamic Heating Data Book - Orbiter Ascent (Books I - III) Ref. Apx. F
STS85-0118	Operational Aerodynamics Design Data Book, Volumes I - V Ref. Apx. F
STS85-0169-1	Structural Design Loads Data Book, Baseline Vehicle Design Criteria and Missions Ref. Apx. F
STS85-0169-2	Structural Design Loads Data Book, Orbiter Structural Loads Ref. Apx. F
STS85-0169-3	Structural Design Loads Data Book, External Tank Structural Loads Ref. Apx. F
STS85-0169-4	Structural Design Loads Data Book, Solid Rocket Boosters Structural Loads Ref. Apx. F
STS85-0169-6	Structural Fatigue Loads Spectra Data Book Ref. Apx. F

STS85-0169-7	Structural Design Loads Data Book, Ground to Flight System Interface Excursion Data Ref. Apx. F
STS85-0169-8	Structural Design Loads Data Book, KSC Mobile Launch Platform Structural Loads Ref. Apx. F
STS85-0462	Space Shuttle IVBC-3 SSME (Nozzle) Entry Aeroheating Data Book Ref. Apx. F
STS90-D0336	Space Shuttle Generic ETR Aerodynamic Heating Data Book External Tank - Ascent Ref. Apx. F
SW-E-0002 (Current Issue)	Ground Support Equipment General Design Requirements, Book 1 - Existing GSE, Book 2 - New GSE Ref. Para. 6.1.11, Apx. F
USAS X3.5 1970	1970 Flowchart Symbols and their Usage in Information Processing Ref. Apx. E
USAS Y14.17 1966	1966 Fluid Power Diagrams Ref. Apx. E
USAS Y32.10 1970	1970 Graphic Symbols for Fluid Power Diagrams Ref. Apx. E

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3.0 CONFIGURATION IDENTIFICATION

Configuration identification determines the manner in which the requirements for and configuration of all program hardware/software is described and the documentation of these descriptions. Configuration identification for the SSP shall be accomplished through the development of formal documentation, defined herein, which will describe the baseline to be used for planning purposes and for control and accounting of future changes. Refer to Appendix E for requirements and guidance in respect to Contract End Item (CEI) specifications, drawings and associated lists selection, identification and preparation. Two general types of baselines shall be addressed, i.e., NASA baseline and design activity/contractor baseline. These requirements will be imposed upon the appropriate design activity/contractor by the responsible NASA Program element/project.

3.1 NASA BASELINE

3.1.1 NASA Requirements Baseline

This baseline shall be defined by the documentation that describes the current NASA approved technical and management requirements (reference Figure 3-1). The NASA requirements shall be described and controlled in program, program element, and project documentation as follows:

<u>Area of Responsibility</u>	<u>Management Responsibility</u>
Program Requirements	Manager, Space Shuttle Program
Program Element/ Project Requirements	Program Element/Project Managers

Initially, the NASA baseline consists primarily of program management and system performance requirements. As the development effort matures, the end item requirements (Orbiter, External Tank [ET], etc.) are defined, baselined, and controlled. Each of the lower level baseline documents are compatible with the requirements of the higher level baseline documents and shall further define, as necessary, those applicable requirements. The baselines are expanded during the development effort as requirements mature. The amount of information to be contained in the baselines is determined on an individual basis.

At the appropriate time, a design freeze of the Shuttle System configurations is established to eliminate unnecessary changes and to preserve the Shuttle System configuration which was verified through the development and Orbital flight test phases of the program. At this time, the NASA baseline is expanded to include the production drawings and a complete description of the product physical and functional configuration. Change approval authority for Class I changes (reference Paragraph 4.1) to the

baseline is elevated to the SSP and selectively delegated. Changes approved by the delegated authority are subject to review by the SSP for system implications.

The specifications for the Space Shuttle System and its elements shall consist of the documents shown in Figure 3-2.

The preceding describes a progressive baseline that is fundamental to the SSP CM approach. A graphical representation of this progressive baseline is shown in Figure 3-3.

The drawings and documents reflected in the Space Shuttle Top Assembly Drawing Tree (Figure 3-4) constitute the SSP baseline requirements for design and construction of the Shuttle System. These requirements shall be implemented by all affected Shuttle System design and Operation and Maintenance (O&M) activities. Implementation and change control responsibilities are defined in Appendix Q.

Program freeze points are established at specific intervals for each flight. The freeze points are defined in NSTS 07700, Volume III, Flight Definition and Requirements Directive.

3.1.2 NASA Acceptance Baseline

The as-built configuration of the flight hardware/software is documented by the accepting SSP element/project at the acceptance review. SSP control of flight hardware configuration commences with the acceptance review (DD-250) unless specified otherwise in Paragraph 4.2, of this document. The software change control point is the approval of the 3-year plan by the Program Requirements Control Board (PRCB).

3.1.3 (Deleted)

3.1.4 Space Shuttle Program Baseline

The SSP baseline documentation shall contain program requirements, Space Shuttle management requirements, system technical requirements, descriptive documentation, and indentured parts listings and other identification documents describing the configuration of all Space Shuttle flight hardware/software. These baseline requirements may be apportioned to the program elements/projects, by the Manager, Space Shuttle Program. The documentation shall contain the following types of data:

- a. Program definition
- b. Program characteristics
- c. Program interface requirements
- d. Program verification requirements

- e. System responsibility allocations
- f. System schedules
- g. System budget and cost allocations
- h. Management system requirements
- i. Information systems requirements
- j. Requirements for system design and performance, ascent flight performance, and element design control parameters
- k. System interface requirements, excluding interfaces to be controlled by a single project office
- l. System verification (acceptance, certification) requirements
- m. Standard design, construction, assembly and installation requirements applicable to the total system
- n. Other applicable allocated requirements
- o. Training requirements
- p. Acceptance baseline configuration descriptions and indentured parts listings for flight hardware/software that has had an acceptance review

3.1.5 Program Element/Project Baseline

The program element/project baseline documentation shall contain specific requirements applicable to the particular program elements/projects. This documentation shall contain the following types of information:

- a. Space Shuttle Program requirements
- b. Element requirements for system design and performance, ascent flight performance, and element design control parameters
- c. Interface requirements
- d. Verification requirements
- e. Design, construction, assembly and installation standards and specifications
- f. Training requirements
- g. Design concepts, approaches, and solutions at the appropriate time
- h. Product configuration descriptions at the appropriate time

3.1.6 Space Shuttle Program Definition and Requirements Baseline Documentation

The SSP baseline is included in, attached to, or referenced from NSTS 07700, Volumes I through XVIII, Space Shuttle Program Definition and Requirements. The Space Shuttle Program Definition and Requirements baseline documentation is identified for reference in the Foreword to this document. The content of each volume is described in NSTS 07700, Volume I, Program Description and Requirements Baseline. All SSP documentation will be baselined and controlled in accordance with the requirements and procedures contained in this document.

3.1.7 Preparation, Coordination, and Processing of Baseline Documents

An Office of Primary Responsibility (OPR) will be assigned for each SSP baseline document. The OPR will manage the preparation and coordination of the requirements to be included in its assigned volumes and, as necessary, coordinate drafts up to and including a final draft of the volume to be recommended for baselining. Final drafts of program documents shall be submitted for initial baselining or subsequent rebaselining with an SSP Change Proposal (CP). Program documents are listed in Appendix F of this volume. Detailed requirements and procedures for preparing, coordinating, and processing SSP baseline documents are provided in Paragraph 4.4.3 and Appendix C of this volume. Specific requirements and procedures for preparing, coordinating, and baselining SSP Interface Control Documents (ICDs) are provided in Paragraph 3.1.8 and Appendix D of this volume.

3.1.8 Interface Control Documents

ICDs shall be used to control interfaces between two or more participating contractors and government agencies. Authority for control of these documents is as follows:

- a. SSP interfaces which depict hardware/software interfaces between program elements/projects shall be controlled by the Manager, Space Shuttle Program. Interfaces between Space Shuttle flight elements as approved by the SSP for implementation in the Shuttle Avionics Integration Laboratory (SAIL) shall be documented in addenda to corresponding flight ICDs. SAIL ICD addenda requirements shall be controlled by the Shuttle Avionics Software Control Board (SASCB) to the extent specified in Paragraph 4.3.2.3.3.1. The SAIL ICD addenda implementation is approved by the NASA-JSC Engineering Directorate SAIL Manager. In addition, processing of payload ICDs which depict interfaces between payload elements and Orbiter services/payload integration hardware shall be controlled by Appendix F in this document. Table F.1 in Appendix F shows the PRCB authority delegations for SSP system and payload ICDs.

- b. Interfaces which depict hardware/software interfaces within a program element/project shall be the responsibility of the affected program element/project office.

The responsible offices shall direct preparation and assure coordination, approval, and maintenance of ICDs. The Space Flight Operations Contract (SFOC) contractor is responsible for coordination and maintenance of SSP system ICDs/Interface Revision Notices (IRNs) in accordance with Appendix D and change control processes identified in Paragraph 4.4. The SFOC contractor is also responsible for coordination and maintenance of SSP payload ICDs/IRNs in accordance with SFOC-PM0065, Product Development Plan for Payload Engineering Products Shuttle-to-Payload Interface Requirements, PDP MS3-001, and SFOC-PM0062, Product Development Plan for Payload Engineering Products Payload Unique Interface, PDP MS3-007, per SFOC Data Requirements Description (DRD) 1.1.1.1.f.

3.1.8.1 ICD Preparation Requirements

ICDs shall be prepared to meet the requirements of this document, Appendix E, for format and content.

3.1.8.2 ICD Repository

SSP systems ICDs/IRNs shall be included in the Space Shuttle Management Integration Office's repository. Program element/project offices shall implement and maintain repositories for program element/project ICDs as required.

3.1.8.3 ICD Changes

Changes to a systems ICD shall be accomplished by an IRN which, when baselined, is incorporated electronically into the systems ICD Technical Document Management System (TDMS) data base and electronically distributed on TDMS.

3.1.9 Acceptance Baseline Configuration Descriptions

The acceptance baseline configuration description shall describe and identify the as-designed configuration with exceptions that reflect the as-built and accepted configuration of an end item. Differences between the as-designed configuration and the as-built configuration shall exist only as a result of NASA approved deviations or waivers or Program Material Review Board (PMRB) dispositions or as Open Work planned to be closed prior to launch. For flight hardware, this shall include, as a minimum, Sections III, IV, and V of the Acceptance Data Package per SN-D-0007, Acceptance Data Package Requirements. For flight software items listed below, this shall include, as a minimum, the deliverable data items identified on the form DD-250 as Items 3, 4, 6 and 7 per SN-S-0008, Software Deliverable Data Package Requirements Specification.

The software programs that have been designated as subject to SN-S-0008 are the following:

	<u>Responsibility</u>
1. Orbiter Primary Flight Software	Space Shuttle Vehicle Engineering Office (Avionics and Software Office)
2. Orbiter Backup Flight Software	Space Shuttle Vehicle Engineering Office
3. Space Shuttle Main Engine Software	SSME Projects Office
4. DEU Control Program	Space Shuttle Vehicle Engineering Office
5. Telemetry Format Loads	Space Shuttle Vehicle Engineering Office
6. CRT Display Formats	Space Shuttle Vehicle Engineering Office
7. GPC Self Test Program	Space Shuttle Vehicle Engineering Office
8. Payload-unique Software	Space Shuttle Vehicle Engineering Office
9. Launch Processing System	Shuttle Management and Operations Directorate

Deviations/Waivers 45, 46, 47, 53, 169, 170, 171, 193, 207, 219, 220, 221, 223, 224, 226, 227, 228, 229, 234, 241, 246, 260, 261, 288, 289, 292, 309, 310, 311, 312, 313 and 314 are applicable to Paragraph 3.1.9.

Refer to Book 2, Configuration Deviations/Waivers.

3.1.9.1 Acceptance Baseline Configuration Description Changes

Changes to an acceptance baseline configuration description shall be accomplished only by authority of the SSP or delegated program element/project. Configuration control of accepted flight hardware/software, including delegated authority, is defined in Paragraph 4.2 and subparagraphs.

3.1.10 Requirements Traceability

The NASA baseline documents shall provide for identifying like and related requirements so that traceability of these requirements can be established up and down through the different levels of the documentation tree.

3.1.11 Baseline Documentation Maintenance

All NASA baseline documentation shall be maintained and kept up-to-date so the approved baseline is always properly identified. The documents shall be maintained up-to-date by approved change notices and change pages. The specific responsibilities and requirements for maintaining the SSP baseline documents are defined in NSTS 07700, Volume V, Information Management Requirements, Paragraph 6.0.

SSP Systems ICDs shall be maintained up-to-date by approved IRNs and document revisions. After authorization of the proposed SSP IRN by the PRCB or delegated

authority, the SFOC Contractor shall electronically incorporate the IRN into the ICD TDMS data base. SAIL ICD Addenda Maintenance Procedures shall be as specified by the SAIL Configuration Management Plan. When directed by the Interface Working Group (IWG) Chair, the SFOC Contractor shall process a record IRN to release the ICD to the next revision letter. The SFOC Contractor shall distribute the revised ICD to the document holders. Detailed procedures/instructions for baselining and revising baselined SSP system ICDs are provided in Appendix D of this document. The affected program element/project office shall define responsibilities attendant to maintenance and control of program element/project ICDs as required.

Revisions/changes to the acceptance baseline configuration description shall be accomplished concurrently with the approved Program Requirements Control Board Directive (PRCBD) flight hardware/software implementation. All of the affected acceptance baseline configuration description documentation shall be revised/changed concurrently in accordance with the PRCBD.

3.2 NASA IN-HOUSE DESIGN ACTIVITY/CONTRACTOR BASELINE

The design activity/contractor's baseline consists of all of the requirements of the NASA baseline plus additional requirements defined by the contractor such as those incorporated in detail specifications, process specifications, released drawings, and any other documents released through the NASA in-house design activity/contractor's formal engineering release system. Configuration identification and document preparation practices/systems employed shall be compatible with the requirements and guidance criteria defined in Appendix E of this document and require NASA validation. Changes to these requirements that do not affect the NASA baseline will be controlled by the NASA in-house design activity/contractor.

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FIGURE 3-1
BASELINE DOCUMENTATION RELATIONSHIPS

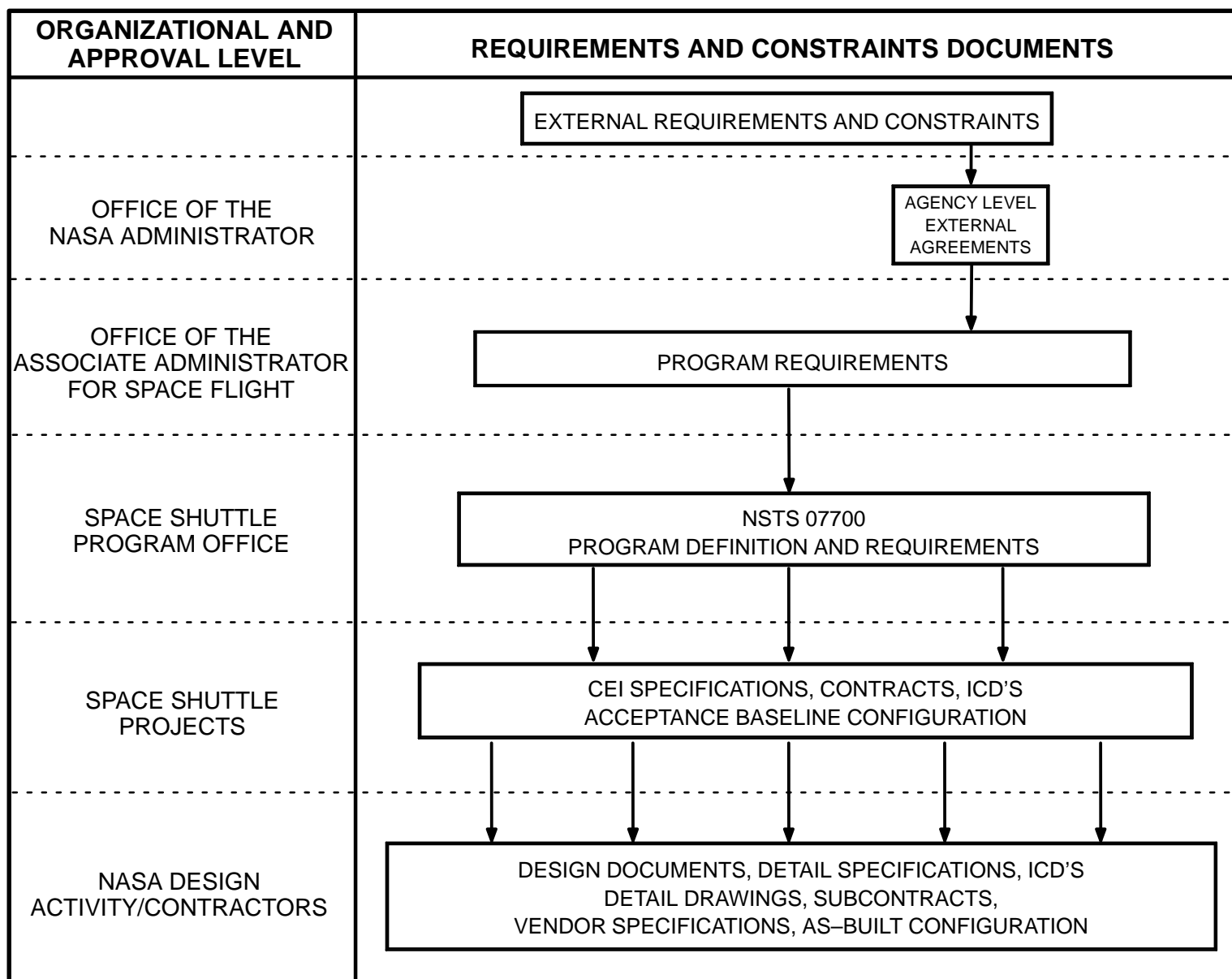


FIGURE 3-2
SPECIFICATION TREE

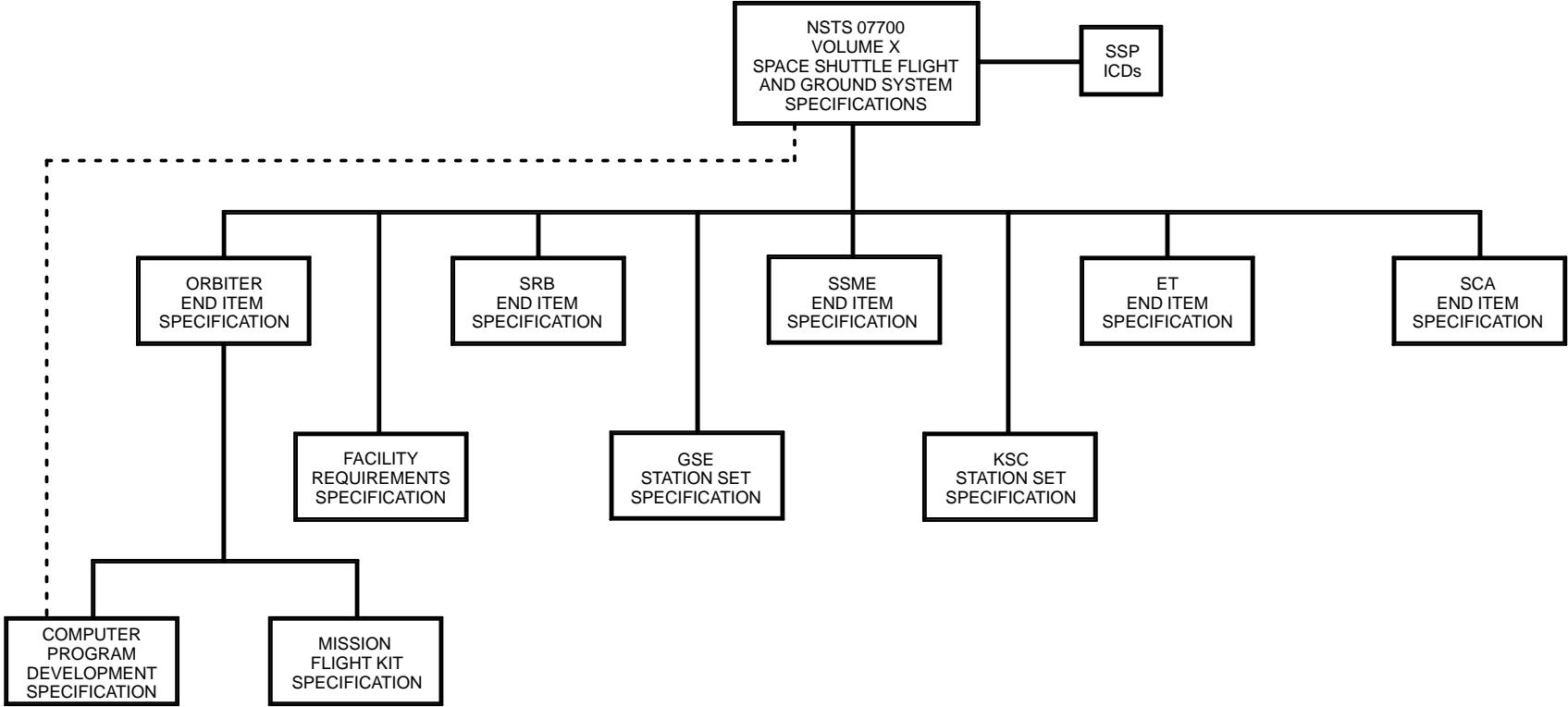


FIGURE 3-3
SPACE SHUTTLE PROGRAM BASELINES

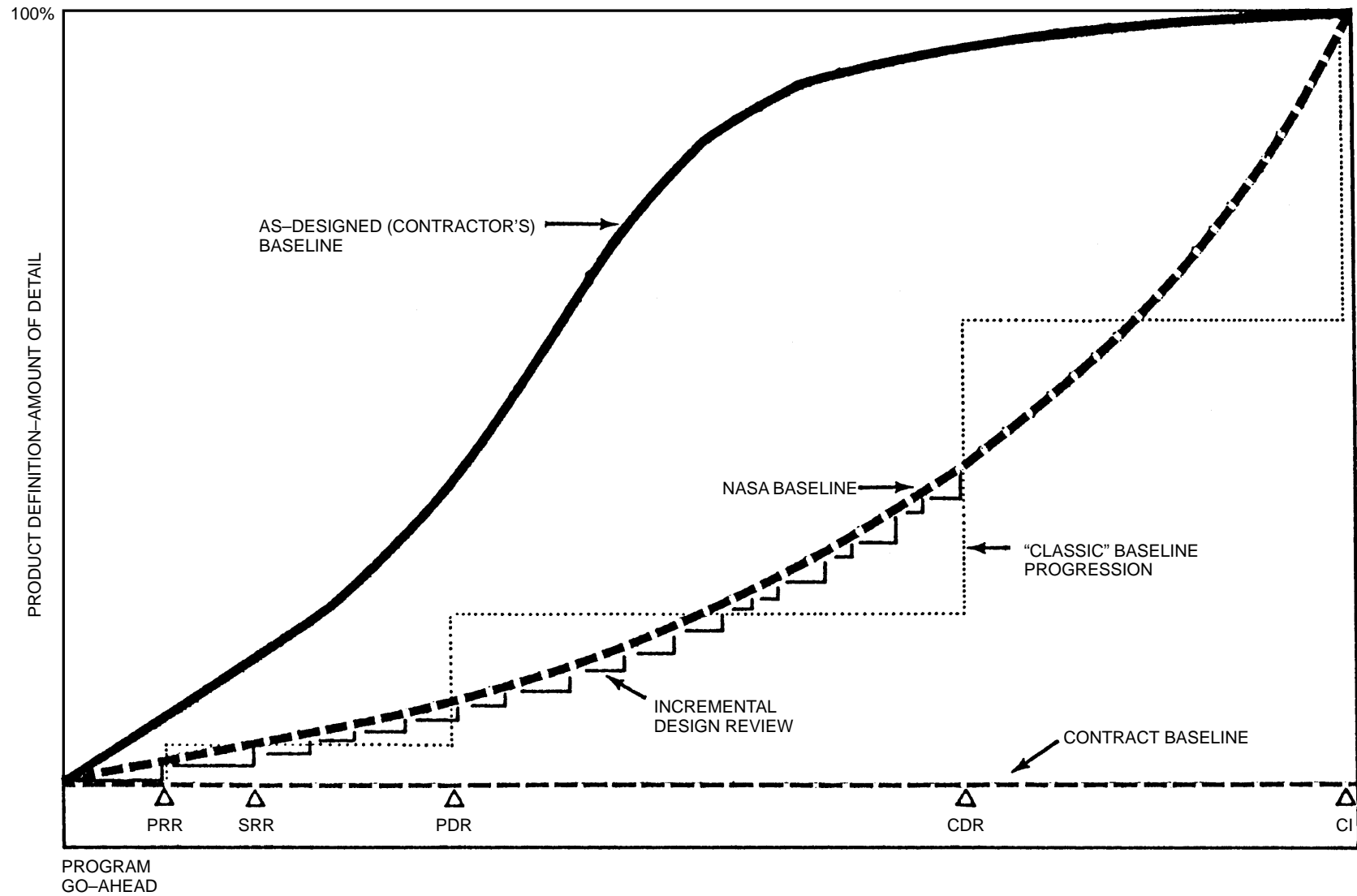
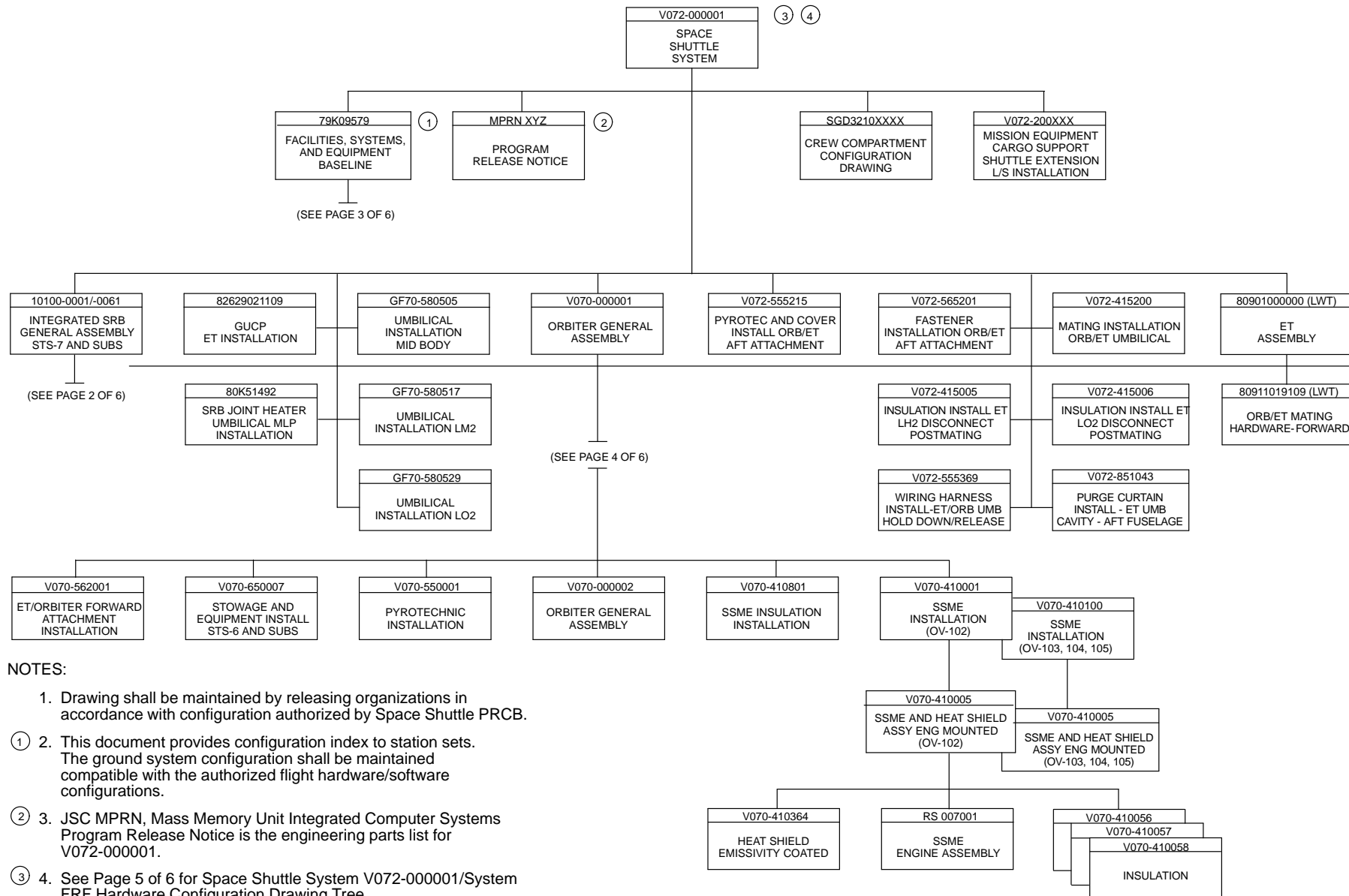


FIGURE 3-4

SPACE SHUTTLE TOP ASSEMBLY DRAWING TREE (EFFECTIVITY: STS-55, STS-51, STS-56 AND SUBS

(Page 1 of 6)



NOTES:

1. Drawing shall be maintained by releasing organizations in accordance with configuration authorized by Space Shuttle PRCB.
- ① 2. This document provides configuration index to station sets. The ground system configuration shall be maintained compatible with the authorized flight hardware/software configurations.
- ② 3. JSC MPRN, Mass Memory Unit Integrated Computer Systems Program Release Notice is the engineering parts list for V072-000001.
- ③ 4. See Page 5 of 6 for Space Shuttle System V072-000001/System FRF Hardware Configuration Drawing Tree.
- ④ 5. See Page 6 of 6 for Space Shuttle Systems Ferry Flight Configuration Drawing Tree.

FIGURE 3-4
SPACE SHUTTLE TOP ASSEMBLY DRAWING TREE
OPERATIONAL FLIGHT SRB
(EFFECTIVITY: STS-55, STS-51, STS-56 AND SUBS)
(Page 2 of 6)

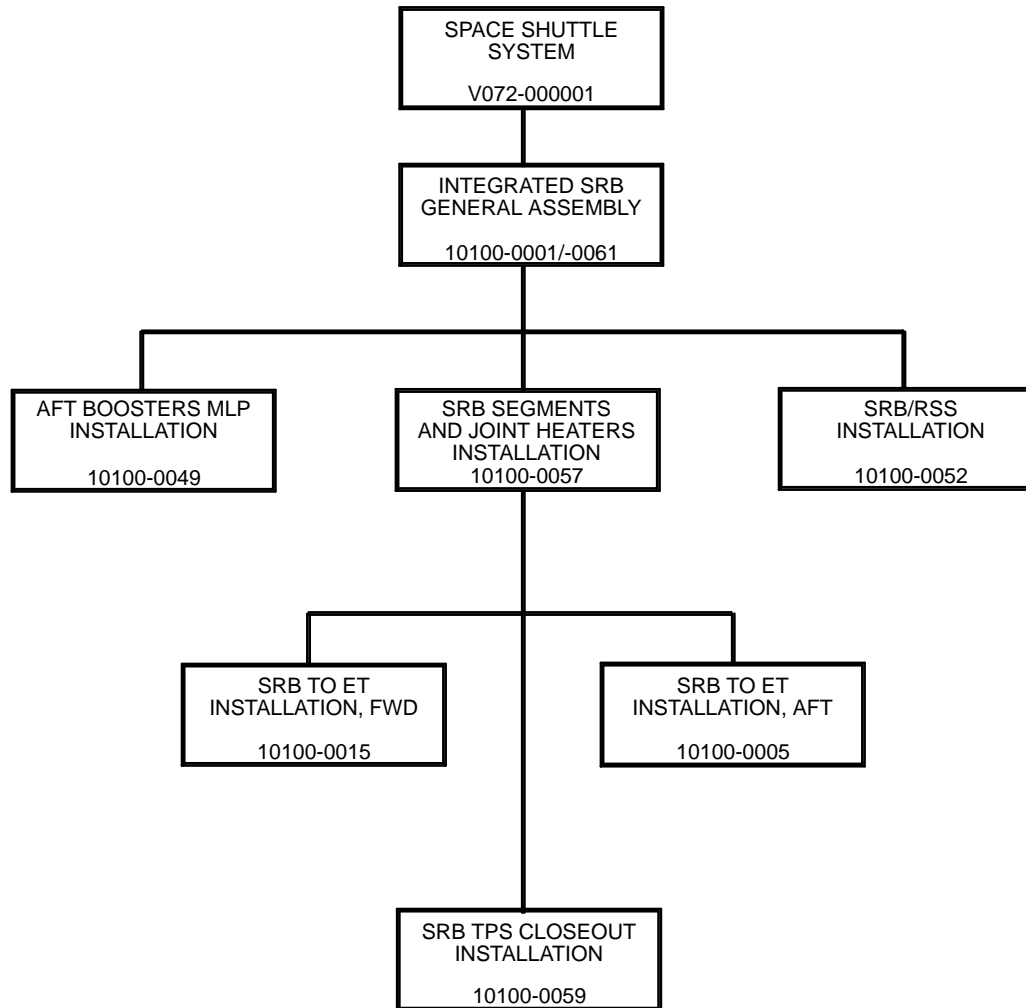


FIGURE 3-4

**SPACE SHUTTLE TOP ASSEMBLY DRAWING TREE
GROUND SYSTEM PHYSICAL INTERFACES WITH VEHICLE
DURING COUNTDOWN FOR LAUNCH**

(Page 3 of 6)

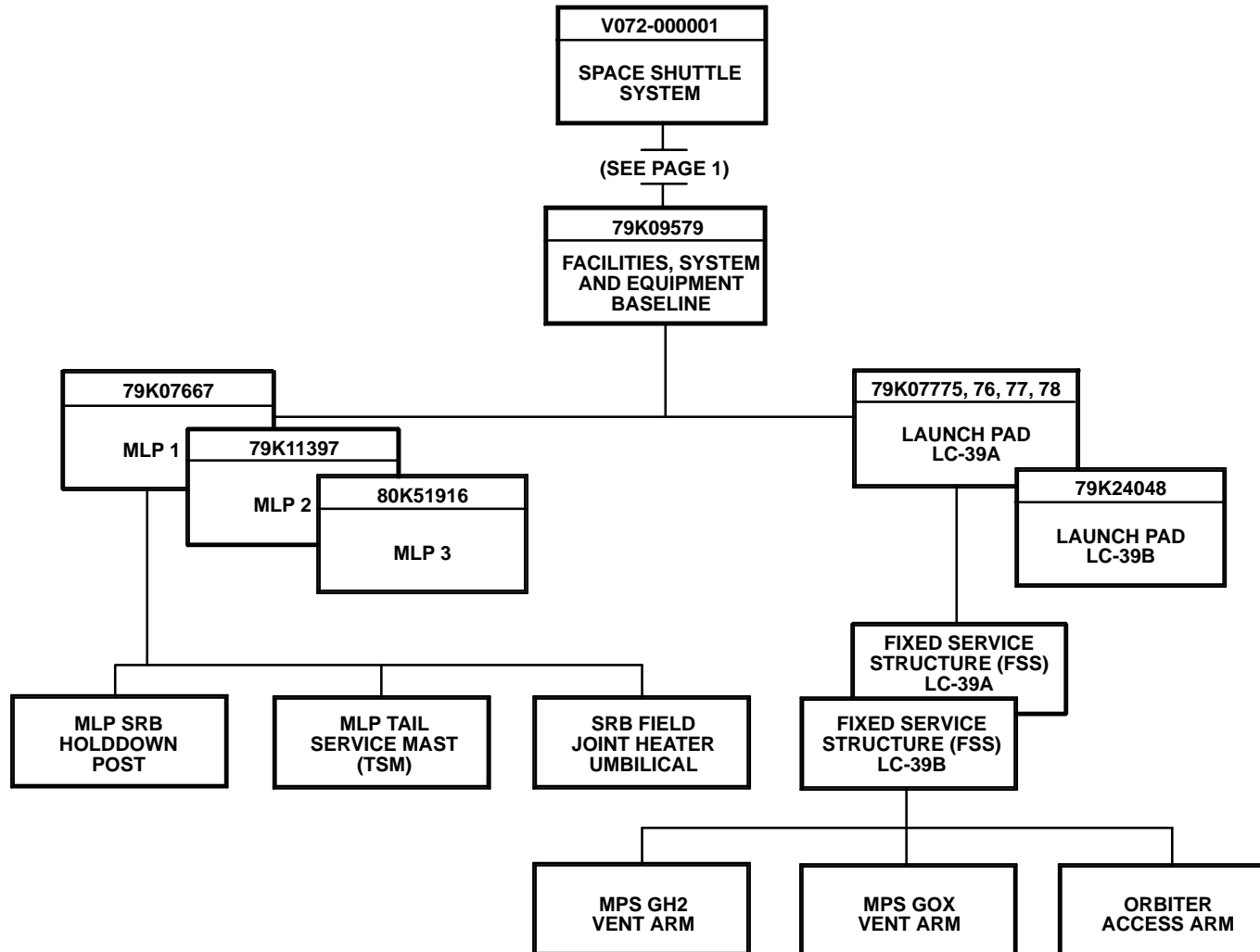


FIGURE 3-4
SPACE SHUTTLE TOP ASSEMBLY DRAWING TREE
ORBITER GENERAL ASSEMBLY COMPLETE
(Page 4 of 6)

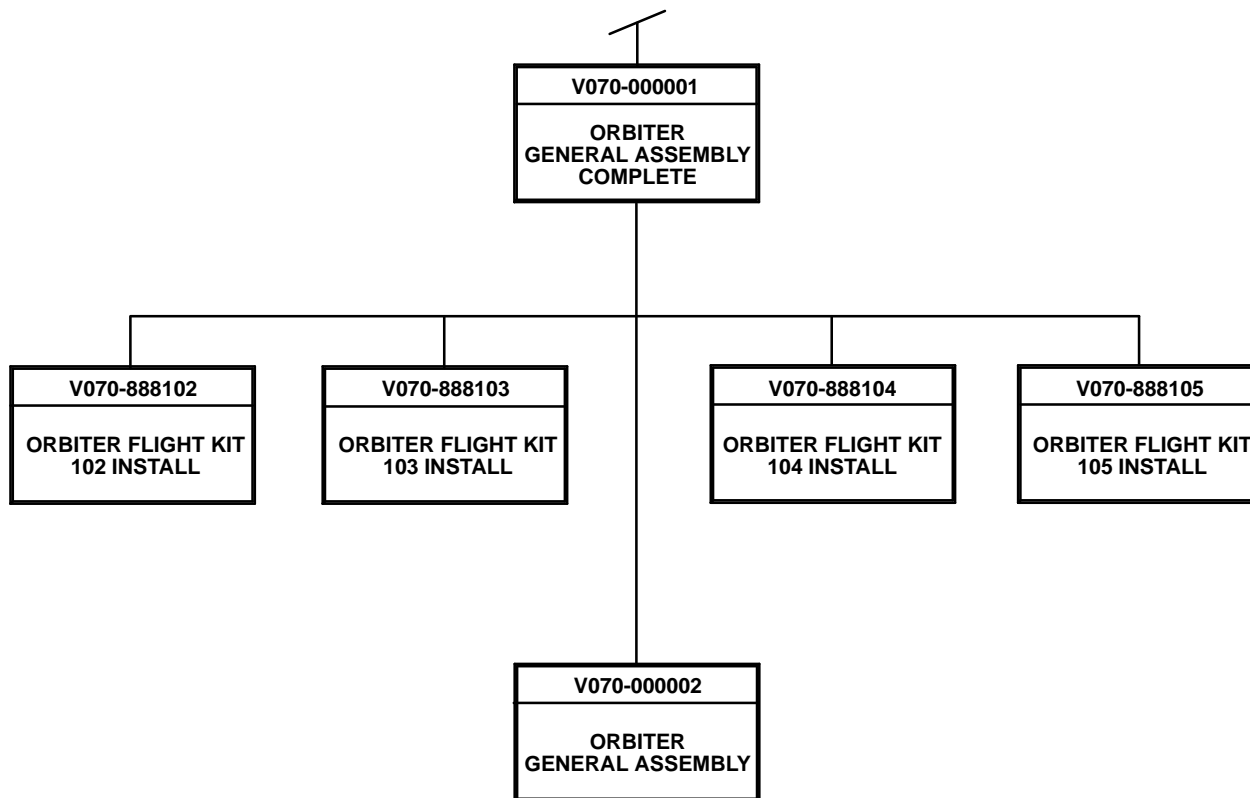
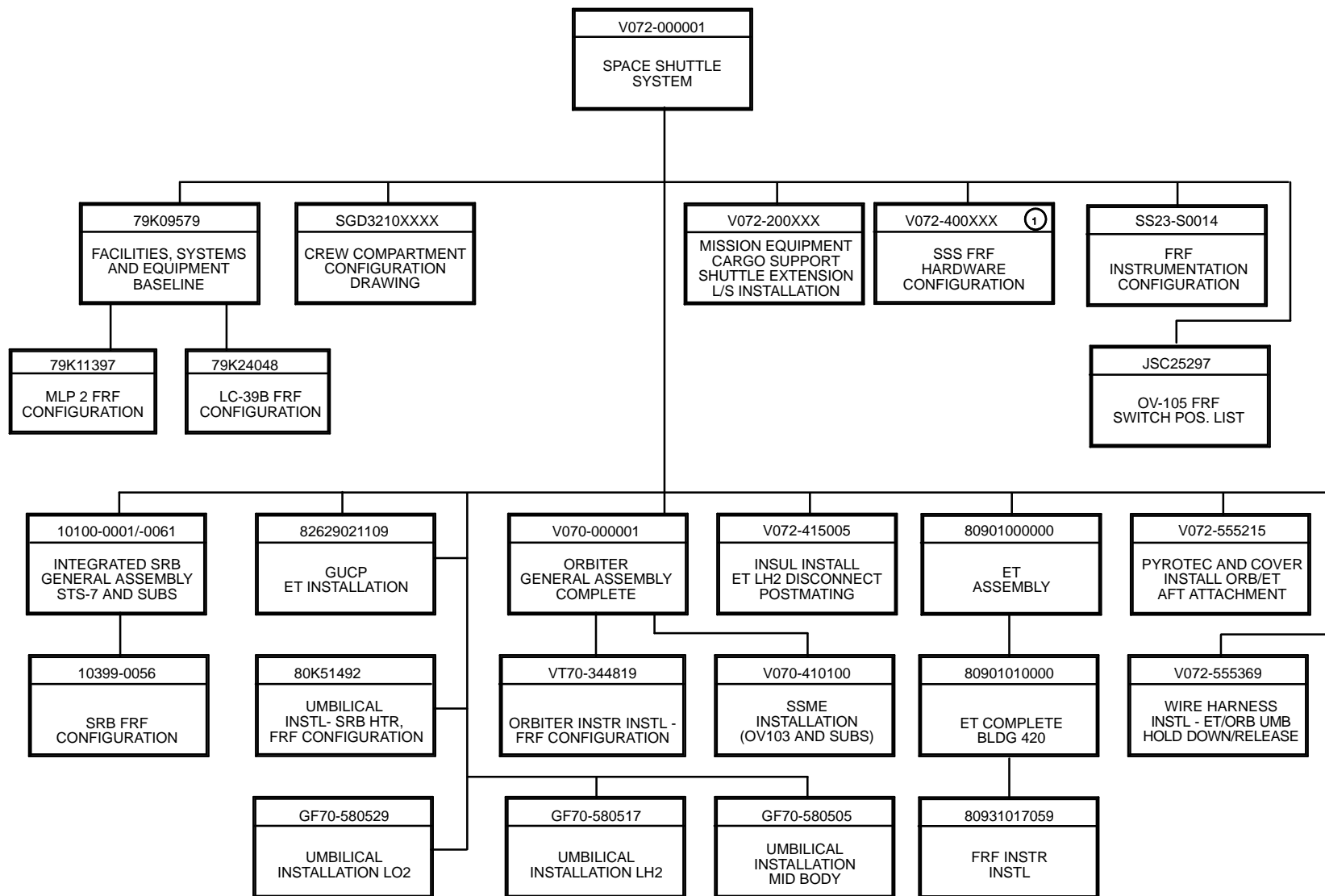


FIGURE 3-4

SPACE SHUTTLE TOP ASSEMBLY DRAWING TREE

FLIGHT READINESS FIRING (FRF)

(Page 5 of 6)



NOTE:

- ① Drawing V072-4000XX is an SSP controlled collector drawing that defines unique hardware and installation requirements for the Flight Readiness Firing.

FIGURE 3-4
SPACE SHUTTLE TOP ASSEMBLY DRAWING TREE
FERRY FLIGHT CONFIGURATION
(Page 6 of 6)

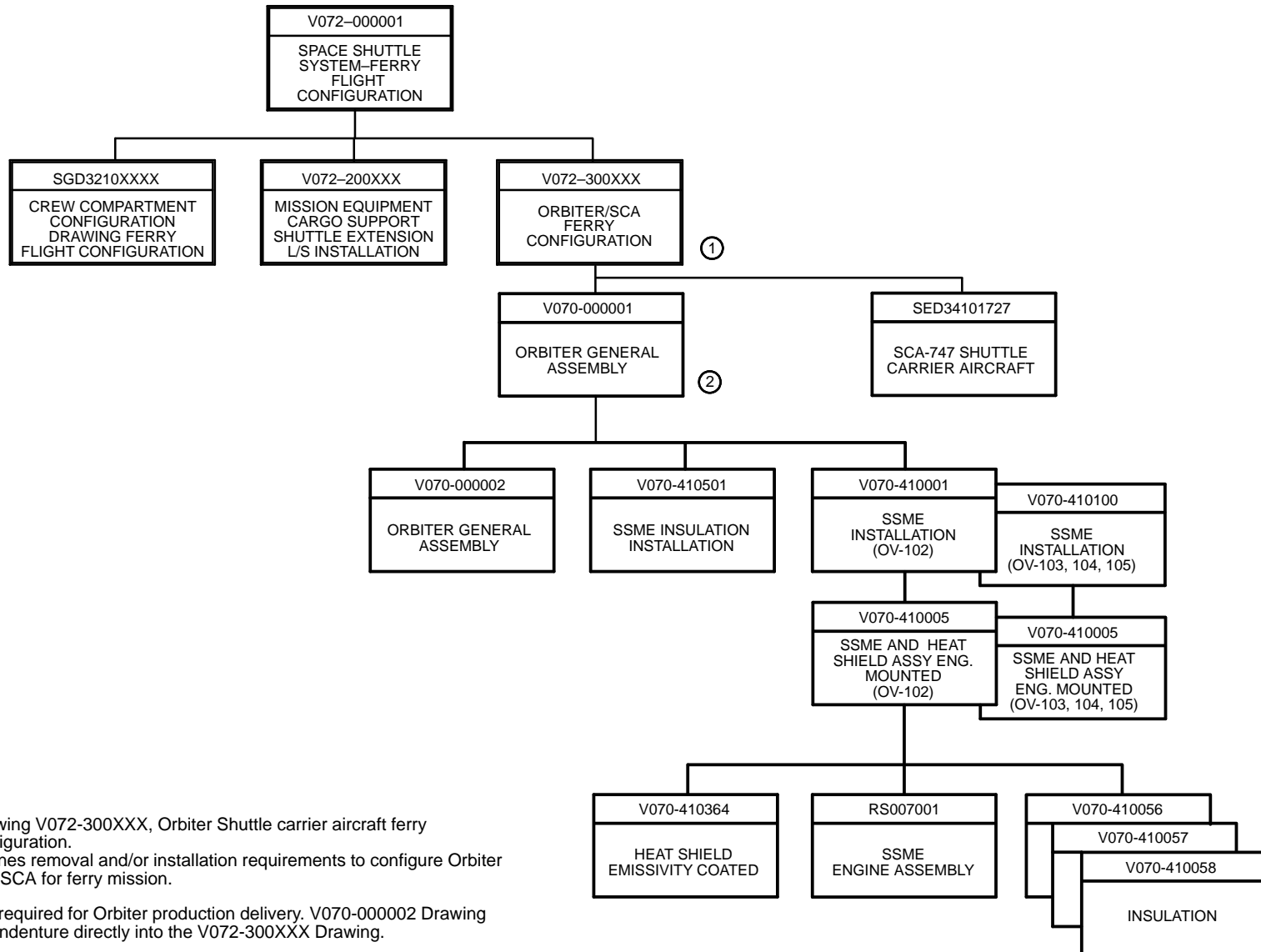


FIGURE 3-4-1

TOP ASSEMBLY DRAWING TREE DEFINITIONS

(Page 1 of 2)

The Space Shuttle System drawing, V072-000001, specifies the configuration of the Space Shuttle flight vehicle, mission-unique software, flight-dependent mission equipment and cargo, the launch pad or Mobile Launcher Platform (MLP), and Launch and Landing station sets integrated and configured to meet the requirements of a specific flight. This includes the Orbiter, SSMEs (installed on the Orbiter), ET, and SRBs configured to meet specific mission/flight requirements as specified by flight requirements documents and integrated to support a specific mission/flight, and calls out the hardware required to mate the Space Shuttle flight vehicle elements into the Space Shuttle System. The Space Shuttle System drawing also includes all computer software programs and data required to load and operate computer subsystems within the Orbiter and in the SSME controllers. The Space Shuttle flight software assembly is centrally stored on the Orbiter Mass Memory Units (MMUs). The MMU software configuration is identified by NSTS 08338, Orbiter Avionics Mass Memory Unit Computer Program Integration Plan, and controlled in accordance with Appendix M.

The Crew Compartment Configuration Drawing (CCCD), SGD3210XXXX, prescribes arrangements, locations and installations of all flight crew equipment, payloads and other hardware to be flown in the Orbiter crew compartment in sufficient detail to support locker prepack at JSC and vehicle stowage installation at KSC.

The Mission Equipment Cargo Support Launch Site Installation (MECSLSI) drawing, V072-200XXX, describes flight kit installations and cargo element installations required to implement the cargo manifest and extend specific capability of the Shuttle System to meet specific mission requirements.

The Facilities, System and Equipment Baseline drawing, 79K09579, describes the configuration of KSC ground systems. 79K09579 and its subordinate drawings (as shown on Page 4 of 6) describe the ground systems which physically interface with the vehicle during countdown for launch at KSC.

FIGURE 3-4-1

TOP ASSEMBLY DRAWING TREE DEFINITIONS

(Page 2 of 2)

The Flight-to-Ground Umbilical drawings tree into the Space Shuttle General Assembly drawing and define the configuration of the umbilical assemblies required for each Space Shuttle flight.

The Inter-element Mating Hardware Assembly and Installation drawings also tree into the Space Shuttle General Assembly drawing and together with the element drawings, describe the inter-element mating and element hardware, and provide detailed mating and installation requirements.

The space flight vehicle elements - Orbiter, ET, SRBs, and SSMEs, - are described on individual element drawings which identify the design configuration of each basic element.

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4.0 CONFIGURATION CHANGE CONTROL

After a baseline is established, it is essential that effective, positive control be established to preclude any unauthorized changes to that baseline. There must be procedures to ensure that each proposed change to the baseline is completely described (including impacts); is thoroughly coordinated, reviewed, and evaluated; and is authorized and implemented in an approved manner. Procedures also must ensure that changes to a baseline are not accepted or implemented that have not been processed in this prescribed manner.

Control of the Space Shuttle requirements and acceptance baselines and changes thereto is to be through the use of Configuration Control Boards (CCBs) and the applicable baseline documentation as defined in Paragraph 3.0. The various configuration control levels for the Space Shuttle Program are depicted in Figure 4-1 and the specific change authority delegated to the program elements and project CCBs is documented in Section 4.3. The Space Shuttle requirements and acceptance baseline consists of the SSP documentation and controlled data base. The process for the control of this documentation and data is found in Section 4.4, Appendix C of this volume, and in the respective CM process documentation utilized by each delegated board.

4.1 CHANGE CLASSIFICATION

All changes shall be classified as either Class I or Class II. All Class I changes must receive NASA approval prior to implementation. Class II changes shall be dispositioned by the contractor's Change Control System and do not require NASA approval. The NASA shall concur on the assigned classification of each change.

After implementation of the design freeze all subsequent Shuttle System production hardware/software shall be built in accordance with the design freeze configuration baseline except for changes or waivers specifically authorized as defined herein. Proposed changes to the design freeze baseline shall be classified as Class I or Class II in accordance with the following criteria.

4.1.1 Class I Change

Changes shall be classified as Class I according to the criteria in Paragraphs 4.1.1.1 and 4.1.1.2 below. For each program element/project, Paragraph 4.1.1.1 shall apply before and Paragraph 4.1.1.2 shall apply after the design freeze is established. The design freeze shall be established for the following hardware/software:

- a. SSME - all flight and production
- b. ET - all flight and production
- c. SRB - all flight and production

- d. Reusable Solid Rocket Motor - all flight and production
- e. Orbiter (including Remote Manipulator System [RMS]) - all flight production
- f. Flight Support Equipment - standard crew equipment
- g. Orbiter Primary Avionics Software, Version 19 and subs
- h. Orbiter Backup Flight Software, Version 12 and subs
- i. KSC Launch Processing System (LPS), Checkout, Control, and Monitoring Subsystem (CCMS), and interfacing Ground Support Equipment (GSE) software
- j. Payload checkout and launch software

After the design freeze is established, all changes meeting the criteria of Paragraph 4.1.1.2 shall require, as a minimum, disposition by the program element/project control board. These control boards are authorized to approve changes which do not affect the criteria of Paragraph 4.3.2.1 and which are:

- a. Make work/make safe (required for proper fit or function or to eliminate an unacceptable safety hazard)
- b. Mission unique (required to configure system for a specific mission)
- c. High payback (results in significant net cost savings, performance increases, or turnaround time reductions)
- d. Necessary to add a new capability to the Shuttle System to meet an approved mission requirement

4.1.1.1 Pre-design Freeze

Before the design freeze is established for a system element, a change shall be classified as Class I when any of the following are affected:

- a. Requirements contained in the NASA baseline.
- b. Contract provisions.
- c. Configuration of hardware/software accepted by NASA including test articles intended for major integrated tests.
- d. The following documentation for a particular configuration of hardware after that configuration has been certified:
 - 1. Engineering drawings
 - 2. Engineering materials and process specifications

3. Engineering acceptance test requirements
4. Certification/verification requirements
- e. Changes which violate the element design control parameters for the International Space Station (ISS) mission in NSTS 07700, Volume X - Book 1, Flight and Ground System Specification, Requirements, Paragraph 3.1.3.1.

4.1.1.2 Post-design Freeze

After the design freeze is established, a change to flight hardware/software shall be classified as Class I when any of the following are affected:

- a. Requirements contained in the formal NASA Space Shuttle Program or program element/project baseline documentation
- b. Space Shuttle Program or program element/project schedule milestones
- c. Contract cost
- d. Contract provisions
- e. Configuration of hardware/software accepted by NASA including test articles intended for major ground test (reference Paragraph 4.2)
- f. Government furnished hardware
- g. Interchangeability (as defined in Paragraph 4.4.13.5) with the acceptance configuration baseline of components or assemblies of production hardware/software not yet accepted by NASA
- h. Crew procedures or training
- i. Flight planning
- j. Mission Control Center hardware/software
- k. Qualification/certification status
- l. GSE, facilities or trainers
- m. Requirements defined in NSTS 08171, Operations and Maintenance Requirements and Specifications Document (OMRSD) or Operations and Maintenance Instructions (OMIs)
- n. Change in procurement source of any item at any level defined by source control drawings
- o. Critical process per NSTS 5300.4(1D-2), Safety, Reliability, Maintainability and Quality Provisions for the Space Shuttle Program

- p. Functional or performance characteristics different from that previously documented or demonstrated in actual operations
- q. Requirements defined in NSTS 08151, Intermediate and Depot Maintenance Requirements Document (IDMRD)
- r. Changes which violate the element design control parameter(s) limits for the ISS mission in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1

4.1.2 Class II Change

Any change which does not fall within the Class I definition shall be designated as Class II.

4.2 CONFIGURATION CONTROL OF FLIGHT HARDWARE/SOFTWARE

Prior to flight hardware/software acceptance, the SSP must authorize any change, except mandatory mission reconfiguration or safety of flight changes, which exceeds the thresholds listed below. Prior-to-acceptance changes, which do not exceed the threshold, must be determined by the program element/project manager to be of sufficient value to warrant implementation.

<u>Threshold</u>	<u>Change Type</u>
NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1, Design Control Weight and/or \$2M Total Cost	Problem resolution Obsolescence Hardware/software compatibility
NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1, Design Control Weight and/or \$500K Total Cost	Safety enhancement Cost enhancement (initial investment) Other discretionary changes

NOTE: For purposes of this prior-to-acceptance change threshold, the design control weights specified in NSTS 07700, Volume X, Flight and Ground System Specification apply to all missions including any ISS mission.

After flight hardware/software acceptance, all configuration changes will require authorization by the SSP or the delegated project. SSP delegations to the delegated program elements and projects are shown in Paragraph 4.3.2.1.1 or Appendix F of this volume. This authorization will be obtained prior to issuance of work authorization at the using site. Changes that do not meet the criteria of Paragraph 4.4.13.6, such as

drawing corrections, clarifications, addition of true alternate parts, and nonmandatory flow enhancement changes (which relax assembly requirements but meet SSP requirements) can be dispositioned by the program element/project CCB. Emergency changes to accepted flight hardware/software may be implemented in accordance with Paragraph 4.4.3.2.1.

Configuration changes which affect any of the SSP criteria defined below must be forwarded to the SSP for disposition. The first implementation of a hardware configuration change, post hardware/software acceptance, must be authorized by the PRCB. Subsequent implementation of the change on additional end items may be authorized as defined in Paragraphs 4.2.1 through 4.2.5.

- a. Impact performance, safety, resources or major milestone schedules.
- b. Affect SSP Systems ICD requirements.
- c. Cannibalization of flight hardware.
- d. Changes associated with resolution of major anomalies or incidents, or changes which are deemed significant to the program.
- e. Engineering or hardware required to incorporate the change will not meet the specified site need date.
- f. A flight hardware change that impacts assembly interchangeability (Paragraph 4.4.13.5).
- g. Impacts other program elements/projects (except as delegated in Paragraphs 4.2.1 thru 4.2.5) or program elements, i.e., changes to mission operations, flight crew operations, flight software, Launch Commit Criteria (LCC), etc.
- h. Element design control parameter(s) limits for the ISS mission in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1.
- i. Cost threshold as defined above.
- j. Design and process changes to Thermal Protection System (TPS), primary structure, pressure vessels, and Criticality 1, 1R, 1S, 2, 2R hardware where certification does not include a demonstration by representative test(s). Hardware changes whose certification was accomplished by analysis through similarity where the similar article was certified by test, and Material Review (MR) items are excluded.

Requests for nonstandard work performed at the launch site which violate the criteria defined in Paragraph 4.4.13.7a, must be forwarded to the SSP for disposition.

4.2.1 Orbiter Configuration Control

Prior to flight hardware acceptance, Orbiter configuration changes which violate the design control weight or cost thresholds in Paragraph 4.2 shall be authorized by the PRCB. The Orbiter acceptance point equivalent is NASA Orbiter Project Acceptance Review (DD-250).

After flight hardware/software acceptance, authority is delegated to the Manager, Space Shuttle Vehicle Engineering (SSVE) to approve the implementation of hardware configuration changes, non-conformance dispositions, and/or nonstandard work to be accomplished at any location which do not violate the criteria defined in Paragraph 4.2. The SSP configuration baseline will be maintained for all authorized changes to accepted flight hardware/software.

4.2.2 ET Configuration Control

Prior to flight hardware/software acceptance, ET configuration changes which violate the design control weight or cost thresholds in Paragraph 4.2 shall be authorized by the PRCB. The ET acceptance point is at the end of NASA ET Project Acceptance Review (DD-250).

After flight hardware/software acceptance, any ET project configuration change which impacts the criteria in Paragraph 4.2 shall be authorized by the PRCB. Implementation of nonstandard work and hardware configuration changes which do not violate the criteria defined in Paragraph 4.2 are delegated to the ET Project Manager and the Space Flight Operations Contract (SFOC), Ground Operations Associate Program Manager (APM), or their designated representatives as follows. For ETs requiring storage at the Michoud Assembly Facility (MAF) subsequent to acceptance, the ET project is delegated configuration control up to the ET Pre-ship Coordination Review (which is the ET launch site requirements freeze point). Joint authorization by the ET Project and the SFOC Ground Operations APM is required subsequent to the ET Pre-ship Coordination Review and prior to ET/SRB Mate Review for implementation of nonstandard work and (1) hardware configuration changes to be accomplished at MAF which are identified subsequent to the freeze point and impact KSC processing, and (2) hardware configuration changes/inspections kits to be accomplished subsequent to delivery of the ET to KSC and prior to the ET/SRB Mate Review. The configuration of this flight hardware is defined in the respective acceptance/deliverable data packages. The SSP configuration baseline will be maintained for all authorized changes to accepted ET hardware.

4.2.3 Reusable Solid Rocket Motor (RSRM) Configuration Control

Prior to each flight hardware/software acceptance, RSRM configuration changes which violate the design control weight or cost thresholds in Paragraph 4.2 shall be authorized

by the PRCB. The RSRM acceptance point is the RSRM Project Data-pack Retrieval Review at the Launch and Landing (L&L) site.

After flight hardware/software acceptance, changes which affect the integrated SRB or launch site shall be controlled as follows:

- a. Prior to ET/SRB mate milestone review, authority is delegated jointly to the RSRM Project Manager and the SFOC Ground Operations APM, or their designated representatives, to approve implementation of hardware configuration changes and nonstandard work which do not violate Paragraph 4.2 and are to be accomplished subsequent to RSRM Data-pack Retrieval Review and prior to the ET/SRB mate.
- b. RSRM changes which affect the SRB and are made subsequent to the RSRM Data-pack Retrieval Review shall be processed in accordance with Paragraph 4.2.3, unless Paragraph 4.2 is violated.
- c. Changes identified after the ET/SRB Mate Milestone Review shall be forwarded to the SSP for disposition.

The SSP configuration baseline will be maintained for all authorized changes to accepted RSRM hardware.

4.2.4 SRB Configuration Control

Prior to flight hardware/software acceptance, SRB configuration changes which violate the design control weight or cost thresholds in Paragraph 4.2 shall be authorized by the PRCB. After flight hardware/software acceptance or equivalent, any SRB project configuration change which impacts the criteria in Paragraph 4.2 shall be authorized by the PRCB. The SRB acceptance point equivalent is each SRB Pre-Delivery Transfer Review (PDTR).

Prior to ET/SRB Milestone Review, authority is delegated jointly to the SRB Project Manager and the SFOC Ground Operations APM, or their designated representatives, to approve implementation of hardware configuration changes and nonstandard work which do not violate Paragraph 4.2 and are to be accomplished subsequent to SRB PDTR and prior to ET/SRB mate. Record type changes authorized by PRCBD S03760F may be approved by SRB project Configuration Control Board Directive (CCBD) as shown in Appendix Q, Paragraph 4.2, Item d, of this document. Prior to PDTR, record type changes authorized by PRCBD S03760F may be approved by SRB contractor

Change Review Board Directive (CRBD). Changes identified after the ET/SRB Mate Milestone Review must be forwarded to the SSP for disposition. The SSP configuration baseline will be maintained for all authorized changes to accepted SRB hardware. All documentation only changes shall be made in accordance with Paragraph 4.2.

4.2.5 SSME Configuration Control

Prior to flight hardware/software acceptance, SSME configuration changes which violate the design control weight or cost thresholds in Paragraph 4.2 shall be authorized by the PRCB. The SSME acceptance point equivalent is NASA SSME Project Acceptance Review (DD-250).

After flight hardware/software acceptance, authority is delegated jointly to the SSME Project Manager and the SFOC Ground Operations APM, or their respective designated representatives, to approve implementation of hardware configuration changes and nonstandard work to be accomplished at the KSC engine shop which do not violate the criteria defined in Paragraph 4.2. The SSP configuration baseline will be maintained for all authorized changes to accepted SSME hardware.

4.2.6 Closed-Loop Accounting of Configuration Requirements

To ensure that the configuration requirements of all flight hardware are properly identified and verified, a closed-loop accounting and verification system shall be implemented by the SSP elements/projects. Program element/project responsibilities are defined in NSTS 07700, Volume XI, System Integrity Assurance Program Plan. The configuration requirements closed-loop accounting information shall be available for program-wide access and review to support major milestones and flight readiness activities. This closed-loop accounting process will consist of the following:

- a. Program Configuration Requirements Definition - A mission specific configuration requirements baseline shall be established consistent with NSTS 07700, Volume III, NSTS 17462, Flight Requirements Document, and PRCBDs. The requirements shall be approved by the SSP or appropriate delegated authority. The requirements baseline shall be maintained current with all approved changes.
- b. Configuration Accounting - Configuration accounting shall consist of the following process. Traceability to the implementing work document by the implementing project shall begin with work planning and be maintained for each requirement in the baseline. The traceability information shall reflect the implementing work document(s) and revision level, if applicable. The current status and milestone constraint for each baselined configuration requirement shall be

maintained by the implementing project and available for program-wide access. As a minimum, closed-loop accounting status information shall include:

1. Open: Requirement is baselined.
 2. Closed: Requirement is baselined, any applicable nonconformances experienced during implementation of the requirement are resolved in accordance with program requirements, requirement is satisfied and traceable to implementing work document(s) and revision level.
 3. Deleted/deferred: Requirement was removed from the baseline by appropriate authority.
- c. Configuration Verification - All baselined configuration requirements implementation shall be verified by the implementing program element/project, through a review of the accomplishing work document(s), as having been completed, deleted or deferred prior to the key processing milestone that is identified as a constraint for completion of the work. This closed-loop verification includes resolution of any nonconformances experienced during implementation of the baselined requirements. The design program element/project is responsible for verifying that the as-built configuration matches the as-designed configuration, consistent with the responsibilities defined in NSTS 07700, Volume XI and NSTS 08117, Requirements and Procedures for Certification of Flight Readiness.

4.3 CONFIGURATION CONTROL STRUCTURE, AUTHORITY, AND RESPONSIBILITIES

The SSP boards control the SSP document baselines and changes to the baseline. The changes are dispositioned by the board Chair with the advice and recommendations of the board members. The Space Shuttle configuration control structure/levels are shown in Figure 4-2.

The following sections describe boards and panels that meet to establish a baseline and control the subsequent changes to the hardware, software, and associated documentation. It is essential that the conduct of the meetings, including teleconferences, be documented and reported. This may be accomplished by audio or video recordings, and/or minutes or other written record. If a meeting is recorded there shall be:

- a. An announcement at the beginning of the meeting that the meeting is being recorded.
- b. A notice posted stating that the meeting is being recorded.

The requirements for an annual process review by the process owners for processes within an NSTS document is shown in Section 3.0 of Appendix F.

4.3.1 Board Delegation

All SSP change authority is vested in the PRCB. The PRCB has the authority to approve changes to all software, hardware, operations and documentation/data under the control of the Shuttle Program. This authority is further delegated by the PRCB to program element boards as documented in this paragraph and Appendix F of this volume. The signature authority for the PRCB is normally the PRCB Chair but this authority may also be delegated by the Chair as documented in Paragraph 4.3.2.1.1, Items a. thru j. or Appendix F of this volume. The Chair will forward changes to the PRCB if the change exceeds the board's delegation or for any other reason at the Chair's discretion. Any delegated board member may reclama a delegated board decision by submitting a CP to the PRCB.

4.3.1.1 (Deleted)

4.3.2 Space Shuttle Program/Program Element Boards

4.3.2.1 Space Shuttle PRCB

4.3.2.1.1 Authority and Responsibilities

The Space Shuttle PRCB shall be the controlling authority for SSP controlled document baselines and changes. All SSP controlled documents are under the configuration control of the PRCB unless this control has been delegated to another board. Delegation does not extend to changes which invalidate or delete hazard controls; or Failure Modes and Effects Analysis (FMEA) Criticality 1, 1R, 1S, or 2R CIL retention rationale. All delegations from the PRCB for controlled documents are documented in Appendix F of this volume.

The Manager, Space Shuttle Program shall authorize changes to V072-201000, MECSLSI - ISS standard drawings. V072-201000 defines standard configurations for OV-103, OV-104, and OV-105 for ISS assembly missions in areas which interface with payload/cargo and payload integration hardware to facilitate vehicle swaps as late as possible to support ISS manifest flexibility. (Reference Paragraph 4.3.2.2.1 for V071-200XXX MECSLSI.)

The following are clarifications on the delegations from the PRCB:

a. SSP ICDs

1. System ICDs

IRN approvals for system ICDs shown in Appendix F are delegated to the Manager, Space Shuttle Systems Integration as shown in Appendix F, Table F.1.

2. Payload ICDs

- (a) Payload class Interface Definition Document (IDD) Preliminary Interface Revision Notice (PIRN) approval is delegated to the specified book manager in the Engineering Products Office as shown in Appendix F, Table F.1.
- (b) Payload-specific and ISS mission on-orbit ICD baseline and change PIRN approval is delegated to the United Space Alliance (USA) ICD Manager, except waiver/deviation/exceedance PIRN approval which is delegated to the Manager, Engineering Products Office, as shown in Appendix F, Table F.1.

b. Prior-to-acceptance/post-acceptance flight hardware/software configuration as defined in Paragraph 4.2

c. Information Requirements Description (IRD)/PIRNs

IRD baseline and PIRN change approval is delegated to the book manager in the Engineering Products Office.

d. NSTS 08171, OMRSD

The Manager, Space Shuttle Vehicle Engineering Office is delegated the authority to disposition Orbiter RCNs, exceptions, and waivers to NSTS 08171, OMRSD, as follows: File II, Volume 3, Shuttle OMRSD limited/time/cycle items (Orbiter related only), File III, all Volumes (excluding Volume 41), and File IX, Volume 2 (excluding Appendix B, SSME Requirements).

All Orbiter RCNs, exceptions and waivers that impact vehicle schedule milestones, certification, or safety shall be forwarded to the Special Daily PRCB for disposition.

Otherwise, non-payload RCNs, waivers, or exceptions shall be authorized by the Special Daily PRCB.

All payload Requirements Change Notices (RCNs), waivers, or exceptions which have an impact to program cost, launch schedule, or safety of flight, which invalidate the basis for certification of the hardware/system, hazard controls, or Criticality 1, 1R, or 1S Critical Items List (CIL) retention rationale, or are forwarded by the Payload Operations and Maintenance Requirements Specifications (OMRS) Working Group (POG) shall be authorized by the Special Daily PRCB. All payload RCNs, exceptions, and waivers that do not impact vehicle schedule or safety shall be authorized as noted below.

The Manager, Space Shuttle Customer and Flight Integration is delegated the authority to disposition payload RCNs, waivers, and exceptions to NSTS 08171,

OMRSD, File II, Volume 2; File II, Volume 4; File II, Volume 6; and File VIII, Volume 1 as follows:

1. Prior to the Delta Launch Site Flow Review (LSFR), payload RCNs will be approved by the Manager, Space Shuttle Customer and Flight Integration.
2. During and after Delta LSFR, RCNs which can be approved by the Manager, Space Shuttle Customer and Flight Integration are as follows:
 - (a) RCN precludes a future waiver or exception.
 - (b) RCN reflects only the incorporation of a previously approved configuration change(s).
 - (c) RCN ensures hardware/software compatibility, such as, one that corrects a Measurement/Stimulus Identifier (MSID) number or switch identification.
 - (d) Any RCN for which the Manager, Space Shuttle Customer and Flight Integration has received authorization from the Manager, Space Shuttle Program.

The Manager, Spacelab Management Office, Marshall Space Flight Center (MSFC), is delegated the authority to disposition payload RCNs, exceptions, and waivers to NSTS 08171, OMRSD, File VII, Volume 1.

The assigned Payload Mission Manager, MSFC, is delegated the authority to disposition payload RCNs, exceptions, and waivers to NSTS 08171, OMRSD, File VII, Volume 2 and File VIII, Volume 3.

The Director, Payload Processing, KSC is delegated the authority to disposition payload RCNs, exceptions, and waivers to NSTS 08171, File VIII, Volume 2.

The Manager, International Space Station Program, is the approval authority for requirement changes within NSTS 08171, File X, Operations and Maintenance Requirements and Specifications Document, International Space Station (ISS) OMRSD. Reference ISS program documentation for any further delegations of approval authority concerning this file.

e. SGD3210XXXX CCCD

The generic core CCCD baseline (SGD32100594-301) shall be authorized by the PRCB. Some generic Core CCCD changes are delegated to the Space Shuttle Vehicle Engineering Office (SSVEO) or the Extravehicular Activity (EVA) project CCB as shown in Paragraphs 4.3.2.3.1 and 4.3.3.3 of this volume. This limited delegation allows these control boards to approve changes to accepted

flight hardware listed in the CCCD and to manifest this modified hardware into the CCCD. The delegated changes shall:

1. Not affect total core weight as specified in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1.2.6.1.
2. Not affect other system elements.

Flight-specific CCCD KSC implementation (drawing release) approvals are delegated to the Integration Control Board (ICB).

NOTE: Flight Crew Equipment CCBs and EVA project CCBs for flight-specific CCCD changes are co-signed by the respective control board Chair and the assigned flight manager per Paragraphs 4.3.2.2.1, 4.3.2.3.1, and 4.3.3.3.1 of this volume. Flight-specific CCBs are approved by the Orbiter Stowage Manager.

- f. NSTS 08934, Shuttle Operational Data Book (SODB), Volumes I through VII

The SODB system is established by Space Shuttle Program Directive (SSPD) 13 in NSTS 07700, Volume II - Book 2, Program Structure and Responsibilities, Space Shuttle Program Directives. SODB change authority is delegated as shown in Paragraph 4.3.2.3.1, Vehicle Engineering Control Board (VECB) authority and responsibilities, and Table F.1 of Appendix F, this document.

- *g. Flight Support Equipment (FSE) Program Requirements Documents (PRDs) listed in NSTS 07700, Volume VI, Flight Support Equipment (FSE) Management, Table 1.1

The Manager, Space Shuttle Program shall authorize PRD changes for FSE Government Furnished Equipment (GFE) hardware/software funded directly by the program. The Manager, Space Shuttle Program may delegate PRD change authority to a program element/project or directorate if program funds are transferred to program element/project or directorate control. No new PRD baseline documents per JSC 23540, Program Requirements Document (PRD) Guidelines, will be required by the program after January 31, 1996.

- *h. FSE Project Management Plans (PMPs) listed in NSTS 07700, Volume VI, Table 1.2

The Manager, Space Shuttle Program shall authorize PMP changes for FSE GFE hardware/software funded directly by the program. The Manager, Space Shuttle Program may delegate PMP change authority to a program element/project or directorate if program funds are transferred to program element/project or directorate control. No new PMP baseline documents per JSC 26287, Project Management Plan (PMP) Guideline, will be required by the

program. PMPs baselined after January 31, 1996 shall comply with JSC 61100, Project Management Plan (PMP) Guideline, as shown in Item i, below.

*i. FSE PMPs listed in NSTS 07700, Volume VI, Table 1.3

The Manager, Space Shuttle Program shall authorize PMP baselines and changes for FSE GFE hardware/software funded directly by the program. The Manager, Space Shuttle Program may delegate PMP baseline and change authority to a program element/project or directorate if program funds are transferred to program element/project or directorate control. PMP guidelines per JSC 61100, Appendix A.3, shall be required by the program.

A PMP document shall not be required if the Manager, Space Shuttle Program exempts the FSE GFE hardware/software from this requirement. Normally, PMP exemptions are requested by the directorate division chief sponsoring the development when the hardware/software is low in criticality, complexity, visibility, risk, and costs less than \$250,000. The project may approve the exemption if program funds for the development have been transferred to project or directorate control. Authorizing documents such as PRCBDs, CCBDs, Technical Task Agreements (TTAs), Memorandum of Agreements (MOAs), and memos between the program or project and directorate shall be used when PMPs are not required.

*j. FSE Project Technical Requirements Specifications (PTRSs) listed in NSTS 07700, Volume VI, Table 1.4

The Manager, Space Shuttle Program shall authorize PTRS baselines and changes for FSE GFE hardware/software funded directly by the program. The Manager, Space Shuttle Program may delegate PTRS baseline and change authority to a program element/project or directorate if program funds are transferred to program element/project or directorate control. PTRS guidelines per JSC 61100, Appendix A.6 shall be required by the program.

*NOTE: The Manager, Space Shuttle Program may delegate PRD, PMP, or PTRS baseline or change authority to a program element manager. A program element manager could be the Manager, Space Shuttle Systems Integration, Manager, Space Shuttle Vehicle Engineering or designee. An FSE GFE controlling project could be the EVA project. A directorate could be the JSC Engineering Directorate, JSC Space and Life Sciences Directorate, or other JSC directorate.

PRCB authorization shall be required 30 days prior to Flight Readiness Review (FRR) for all PRD, PMP or PTRS changes that invalidate the basis for hardware certification, SSP critical processes, baselined hazard controls, or CIL retention rationale; or introduce new CIL items, or critical or

catastrophic hazards. FMEA/CIL and hazard reports shall be prepared and submitted for approval in accordance with the requirements of NSTS 22206, Requirements for Preparation and Approval of FMEA and Critical Items List (CIL); NSTS 22254, Methodology for Conduct of Space Shuttle Program Hazard Analyses; and NSTS 07700, Volume V, Appendix C, 1SR-2 and 2SR-22.

- k. The Manager, SSP Industrial Engineering, is delegated authority to approve Industrial Engineering for Safety (IES) upgrades, with specific authority and responsibility to:
 1. Review and approve IES upgrades to the Space Shuttle Program of \$5 million EAC or less.
 2. Review and forward to the PRCB all IES Space Shuttle upgrades which impact the major milestone schedule.
 3. Review and forward all Space Shuttle IES upgrades which violate program requirements or potentially result in an increase in risk to the PRCB.
 4. Establish and control baseline budgets and schedules for IES upgrades approved by the PRCB.
 5. Periodically review the status of each approved IES upgrade.

All documents are of the latest issue approved. The Space Shuttle PRCB will resolve any issues submitted to it by a PRCB member in accordance with the procedures defined herein.

Prior to the design freeze, SSP approval is required for changes which violate the element design control parameter(s) limits for the ISS mission in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1.

Following implementation of the Space Shuttle design freeze configuration baseline (reference Paragraph 4.1), SSP approval is required in accordance with Paragraph 4.2 for all changes to flight hardware/software which affect:

- a. Requirements contained in the SSP baseline
- b. SSP milestones
- c. SSP budget allocations
- d. Expenditure of funds which deviate from the Program Operating Plan (POP) baseline budget, requiring Allowance for Program Adjustment (APA), or reprogramming
- e. Configuration of accepted/delivered hardware/software (reference Paragraph 4.2 and subparagraphs, and Paragraph 4.4.13.6)

- f. System interface characteristics (physical or functional), e.g., a flight hardware change which affects a mating element interface, flight software, checkout software, Master Measurement List (MML), and NSTS 08171, OMRSD, File II
- g. L&L site GSE or facilities
- h. Interchangeability, as defined in Paragraph 4.4.13.5 of Criticality 1, 1R or 1S hardware
- i. The element design control parameter(s) limits for the ISS mission in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1

Refer to Paragraph 4.4.13.6 for Special Daily Space Shuttle PRCB change submittal criteria.

Deviations/Waivers 89 and 187 are applicable to Paragraph 4.3.2.1.1.
Refer to Book 2, Configuration Deviations/Waivers.

4.3.2.1.1.1 (Deleted)

4.3.2.1.1.2 (Deleted)

4.3.2.1.2 Membership

- a. Chair
Manager, Space Shuttle Program
- b. Secretary
Manager, Space Shuttle Management Integration
- c. Members
Manager, Launch Integration, KSC
Manager, Space Shuttle Program Integration
Manager, Space Shuttle Program Development
Manager, Space Shuttle Systems Integration
Manager, Space Shuttle Customer and Flight Integration
Manager, Space Shuttle Vehicle Engineering, JSC
Manager, Space Shuttle KSC Integration
Manager, Space Shuttle Business Management
Director, Engineering, JSC
Director, Flight Crew Operations, JSC
Director, Mission Operations, JSC
Director, Safety, Reliability, and Quality Assurance, JSC
Director, Space and Life Sciences, JSC
Manager, Extravehicular Activity (EVA) Project, JSC

Director, Shuttle Processing, KSC
Director, Payload Processing, KSC
Director, Logistics Operations, KSC
Manager, Shuttle Projects, MSFC
Manager, Space Shuttle Main Engine Project, MSFC
Manager, External Tank Project, MSFC
Manager, Solid Rocket Booster Project, MSFC
Manager, Reusable Solid Rocket Motor Project, MSFC
Representative, Propulsion Test Directorate, SSC
Representative, USAF Space Systems Division
SSP, Program Manager, SFOC

4.3.2.2 Integration Control Board

The ICB is an SSP Control Board representing the control authority for changes to systems and operations integration requirements.

4.3.2.2.1 Authority and Responsibilities

The Chair, ICB or designee is delegated authority to initially baseline, disposition, and implement proposed changes to requirements as defined in Appendix F. Appendix F establishes the requirements documents that are controlled by the SSP and documents the baseline and change control authority for these documents. The ICB is further authorized to prepare and maintain SIPs in support of SSP changes. The CM procedures for the ICB are documented in Appendix C of this volume. All changes affecting program cost, risk, schedules, ascent flight performance, or element maximum design control weight shall be forwarded to the Space Shuttle PRCB for disposition. Changes may also be taken to the PRCB at the discretion of the ICB Chair.

The following are details of the delegation to the ICB:

- a. Integration plans which include Payload Integration Plans (PIPs) and PIP Annexes (except Annex 8, Launch Site Support Plan), Mission Integration Plans (MIPs), Carrier Integration Plans (CIPs), and Integration Plans (IPs) are subject to the following:
 1. Any IP impacting established budget constraints, KSC processing flow times, requiring non-trivial Orbiter modifications (hardware or software) or requiring first-of-a-kind operations requires approval by the Manager, Space Shuttle Program.
 2. IP agreements should not vary from established NSTS 07700, Volume XIV, System Payload Accommodations, as specified in Standard Integration Plans, Interface Definition Documents (including ICD 2-19001), Shuttle

Orbiter/Cargo Standard Interface Control Document, and Volume XIV appendices. Mission design relating to crew operations must stay within NSTS 37326, Shuttle Crew Scheduling Constraints, and flight design requirements must stay within the groundrules and constraints documented in NSTS 21075, Space Shuttle Operational Flight Design Standard Groundrules and Constraints. Allowable variations not requiring Space Shuttle PRCB approval will be at the judgment of the Chair, ICB.

3. Sections 4, 7, and 9 of the IPs are the primary sections wherein content must be closely evaluated. Specific topics requiring Space Shuttle PRCB approval are:

Section 4 - Orbit shapes and inclinations not previously flown. Payload weights which put Orbiter weight outside certified limits.

Section 7 - Major hardware developments requiring APA or Space Shuttle Development funds. Developments requiring significant Orbiter modifications.

Section 9 - Requirements with impacts to standard KSC launch or landing processes and flows.

- b. NSTS 17462, to include the Flight Requirements Document, Blank Book, and Appendix B, Power, Video, and Data Plug-in Plan, and ISS Standard.

NOTES: 1. Flight-specific Flight Requirements Document (FRD) or Appendix B changes (excluding Plug-in Plan baselines) which affect KSC requirements, budgets or schedules after Delta LSFR must be approved by the Space Shuttle PRCB.

2. For changes in requirements to the ISS standard FRD or to the flight-specific ISS mission FRDs that deviate from V072-201000, SSP PRCB approval is required.

- c. Flight production schedules are delegated to the ICB Chair.

- d. System Drawings.

1. V072-000001 Space Shuttle System
2. V072-200XXX MECSLSI
3. V072-300XXX Orbiter/SCA Ferry
4. V072-400XXX FRF Hardware Configuration
5. SGD3210XXXX Crew Compartment Configuration Drawing

Authority is delegated to the Manager, Space Shuttle KSC Integration Office to approve baseline flight-specific implementation direction for the V072-000001,

V072-200XXX, V072-300XXX, V072-400XXX, and SGD3210XXX. Authority to approve changes to the drawings is delegated to the Manager, Space Shuttle KSC Integration Office for all except the V072-200XXX and the SGD3210XXX. Change approval for the V072-200XXX is delegated to the daily Mission Integration Control Board (MICB). The daily MICB is chaired by USA Program Integration. EVA Project CCBDs and Flight Crew Equipment CCBDs for flight-specific CCCD changes are co-signed by the respective CCB Chair and the assigned Flight Manager (reference Paragraphs 4.3.2.1.1, 4.3.2.13.1, and 4.3.3.3.1 of this document). Reference Paragraph 4.3.2.1.1 for V072-201000, MECSLSI - ISS standard.

e. NSTS 07700, Volume III.

NOTE: Up to and including the FPSR, authority is delegated to the ICB for the manifesting of standard and nonstandard secondary payloads, providing such addition is in accordance with established ascent performance and Center-of-Gravity (CG) margin guidelines, and provided that the addition does not impact SSP schedule milestones or budget. Any exceptions will be brought to the Space Shuttle PRCB for approval. Manifesting of primary and complex secondary payloads must be approved by the Space Shuttle PRCB.

f. NHB 1700.7A, Safety Policy and Requirements for Payloads Using the Space Transportation System, or NSTS 1700.7B (same title), as applicable.

NOTE: Approval of deviation type Noncompliance Reports (NCRs) to the safety requirements in these two documents is delegated to the Payload Safety Review Panel (PSRP). If NHB 1700.7A applies, changes are limited to deviations/waivers only.

g. NSTS 08209, Volumes I - V and VII, Shuttle Systems Design Criteria.

NOTE: All applicable SSP elements and technical managers shall provide support for verifying the data contained in the above documents, except the historical Volumes II and VII. Any changes to these data require the processing of an SSP CR by the appropriate element, technical manager, or SSP lead engineer.

h. NSTS 08329, Volume VI, DOLILU II Definition and Requirements Document, DOLILU II Quality Assurance Rules and NSTS 08329, Volume VIII, DOLILU II Definition and Requirements Document, DOLILU Operations Support Plan.

NOTE: All applicable SSP elements and technical managers shall provide support for verifying the data contained in the above documents. Any changes to these data require the processing of an SSP CR by the appropriate element, technical manager, or SSP lead engineer.

- i. Implementation plans for integration and operations of payloads on carriers for which the SSP is responsible for the integration are documented in PRDs. The approval authority for these documents is delegated to the Payload Integration Managers (PIMs).
- j. Ascent Flight Design Freeze Point (AFDFP).

NOTE: Any AFDFP that recommends use of a non-standard performance enhancement (i.e., 106 percent SSME power level, non-standard consumables loads) shall be forwarded to the PRCB for approval. Additionally, any AFDFP that recommends use of OMS assist for reasons other than primary payload lift capability and/or accomplishment of primary mission objectives shall be forwarded to the PRCB for approval.

- k. NSTS 37326.

Change authority is delegated to the ICB chaired by the Manager, Space Shuttle Program Integration or designee as shown in Table F.1 of Appendix F, of this document. Flight-specific exception is delegated to the flight-specific flight manager as shown in Appendix F, Table F.1 of this document.

- l. Shuttle Systems Design Criteria Critical Math Model database.

All applicable SSP elements and system integration technical managers shall ensure the validity of the data contained in the above database. Data responsibilities for SSP elements and system integration technical managers are described in the CMMDB overview and CMM support matrix sections of the database. Any changes to these data require the processing of an SSP CR by the appropriate element, technical manager, or SSP lead engineer.

4.3.2.2.1.1 (Deleted)

4.3.2.2.1.2 (Deleted)

4.3.2.2.1.3 (Deleted)

4.3.2.2.1.4 (Deleted)

4.3.2.2.1.5 (Deleted)

4.3.2.2.2 Membership

- a. Chair
Manager, Space Shuttle Program Integration or designee

- b. Secretary
Representative, Space Shuttle Management Integration (Configuration Management)
- c. Members
Manager, Space Shuttle Manifest and Schedules
Manager, Space Shuttle Business Office (Systems and Operations Integration Business Team)
Manager, Space Shuttle Systems Integration
Manager, Space Shuttle Customer and Flight Integration
Representative, Space Shuttle Vehicle Engineering, Flight Crew Equipment, JSC
Manager, Space Shuttle KSC Integration, KSC
Representative, Astronaut Office, JSC
Representative, Mission Operations Directorate, JSC
Representative, Engineering Directorate, JSC
Representative, Safety, Reliability, and Quality Assurance, JSC
Representative, Space and Life Sciences Directorate, JSC
Representative, EVA Project, JSC
Representative, Launch and Landing Projects, KSC
Representative, Projects Management Chief, KSC
Representative, Logistics Operations, KSC
Representative, Space Shuttle Main Engine Project, MSFC
Representative, External Tank Project, MSFC
Representative, Reusable Solid Rocket Motor Project, MSFC
Representative, Solid Rocket Booster Project, MSFC
Representative, United Space Alliance
Representative, Program Integration Subcontractor

4.3.2.2.3 Extended ICB Authority and Responsibilities

4.3.2.2.3.1 Flight Production Schedules Authority and Responsibilities

The Flight Production Schedules Working Group is a working group governed by the ICB. The operating procedures for this working group are in NSTS 07700, Volume II - Book 2, SSPD No. 129. The group is responsible for controlling and managing the development and processing of flight production schedules for each Space Shuttle mission. Additional procedures are documented in this document, Appendix C.

4.3.2.2.3.2 Payload GFE Requirement Verification Authority and Responsibilities

The Chair, ICB is also delegated authority to determine if the payload GFE items, which consist of payload unique hardware, meet the requirements of documents listed below and to issue an ICB directive indicating approval or corrective action as appropriate. These documents include baseline requirements, end-item specifications, and acceptance baseline configuration descriptions which are applied to payload GFE items.

- a. NSTS 07700, Volume XIV, System Payload Accommodations
- b. NSTS 5300.4(1D-2)
- c. NSTS 22206
- d. NSTS 22254
- e. JSC 17481, JSC Safety Requirements Document for Space Shuttle Flight Equipment
- f. JSC 23540

4.3.2.2.3.3 Daily Mission Integration Control Board (DMICB)

The DMICB is a special ICB that dispositions changes to flight data products and integration hardware provided to KSC. The DMICB function is to approve, in a timely manner, implementation of changes directed or about to be directed by the ICB. DMICB CRs are approved by the Chair, Daily MICB. The CM procedures for the DMICB are documented in the USA Product Development Plan, SFOC-PM0063, Product Development Plan for Reconfiguration Engineering PDP MS3-002.

4.3.2.2.3.4 Flight-specific Integrated Product Teams' (IPTs) Authority and Responsibilities

A flight-specific IPT, whose members represent the principle organizations responsible for mission integration and operations, will be formed to increase the program focus on flight-specific preparation and implementation. The IPT, chaired by the flight manager, will consolidate flight-specific programmatic decisions across the flight preparation and production processes. The IPT will typically be established when the Flight Definition and Requirements Directive is baselined for a particular flight.

The flight manager is responsible for the review of flight status and resolution of payload, cargo, and mission issues for launch readiness and mission operations within existing program policy. In this capacity, the flight manager will have delegated authority for the ICB to disposition flight-specific exceptions to PIPs, MIPs, IPs, flight-specific FRD changes and flight-specific exceptions to the Shuttle Crew scheduling constraints. All change evaluations will be submitted directly to the initiator or book manager, as appropriate, who will then integrate a response/recommended disposition to the flight manager. The flight manager is also responsible for overseeing the delivery of flight products and of ensuring that any schedule issues are resolved through the IPT.

4.3.2.3 Vehicle Engineering Control Board (VECB)

4.3.2.3.1 Authority and Responsibilities

The VECB is an SSP Control Board representing the control authority for changes as follows:

- a. Orbiter vehicle configuration, hardware, end-item specification, and acceptance baseline
- b. Shuttle flight software and flight software interfaces with ground based computer systems
- c. Portable Onboard Computer (POC) hardware configuration, software integration, software configuration, and POC hardware/software procurements
- d. Intravehicular Activity (IVA) crew equipment configuration
- e. RMS and Space Vision System (SVS) configuration and end-item specifications

The VECB authority and responsibility shall include the authority to disposition test and checkout requirements and requirements non-conformance such as waivers, exceptions, and Discrepancy Reports (DRs). All changes affecting program cost, safety, controlled schedule milestones, the manifest, or exceed the maximum design control weight shall be reviewed by the VECB and forwarded to the Space Shuttle PRCB for disposition. Changes may also be taken to the PRCB at the discretion of the VECB Chair. The CM procedures for the VECB are documented in JSC 09082, Orbiter Projects Office Configuration Management Plan. The SSVEO will utilize the following VECB delegated board structure to carry-out PRCB delegated authority:

- a. Shuttle Avionics Software Control Board (SASCB)
- b. Portable Onboard Computing Control Board (POCCB)
- c. Flight Crew Equipment Configuration Control Board (FCE CCB)
- d. Remote Manipulator System Configuration Control Board (RMS CCB)
- e. Orbiter Review Board (ORB)

4.3.2.3.2 Membership

- a. Chair
Manager, Space Shuttle Vehicle Engineering (SSVE)
- b. Secretary
Representative, Space Shuttle Management Integration (Configuration Management)

- c. Membership
 - Deputy Manager, SSVE Operations
 - Deputy Manager, SSVE Development
 - Manager, SSVE Avionics and Software
 - Manager, SSVE Operations Engineering
 - Manager, SSVE Flight Crew Equipment
 - Manager, SSVE Remote Manipulator System Integration
 - Representative, Space Shuttle Systems Integration
 - Representative, Space Shuttle KSC Integration
 - Representative, Space Shuttle Business Management
 - Representative, Safety, Reliability, and Quality Assurance, JSC
 - Representative, Engineering (Space Shuttle Chief Engineer), JSC
 - Representative, Mission Operations, JSC
 - Representative, Flight Crew Operations, JSC
 - Manager, SSVE JSC Resident Office, KSC
 - Representative, Shuttle Processing, KSC
 - Representative, Logistics Operations, KSC
 - Representative, United Space Alliance
 - Representative, Boeing Reusable Space Systems (Orbiter - Non-SFOC)

4.3.2.3.3 Shuttle Avionics Software Control Board (SASCB)

4.3.2.3.3.1 Authority and Responsibilities

The SASCB is the SSVEO controlling authority for changes to Shuttle flight software and flight software interfaces with ground based computer systems and for changes to the SAIL requirements. All proposed changes to released configurations of Shuttle flight software shall be dispositioned by the SASCB, or by the Space Shuttle PRCB, prior to implementation. The SASCB governs the procedures and products which define the delivery of Space Shuttle flight software, telemetry configurations, electronics measurements and stimuli, and associated data. Further information on these functions is contained in NSTS 08338, Orbiter Avionics Mass Memory Unit Computer Program Integration Plan, and Appendices M, P and X of this document.

In addition, in accordance with NSTS 07700, Volume XI, Paragraph 1.7.1, Subparagraph o, the SASCB is the SSP controlling authority for changes to Criticality 1, 1R, and 1S software in the Space Shuttle Main Engine Controller (SSMEC).

The SASCB functions as the CCB for Shuttle flight software and for ground based computer programs and data used to develop and/or reconfigure flight software. The SASCB is authorized to disposition proposed changes that do not impact Space Shuttle budgets, SSP controlled milestones, or other SSP requirements and changes to software requirement specifications, discrepancy reports, mission-configurable datasets

(e.g., I-Loads, payload data, systems data, telemetry data), and associated development schedules.

The SASCB is authorized to disposition changes for patches to the flight software final load which results from approved PRCB changes (e.g., late Flight Definition Requirements Directive [FDRD] changes).

The SASCB will review all changes to Criticality 1, 1R, and 1S software for the concurrence of the cognizant requirements organizations and sustaining engineering organizations for all such proposed changes. The SASCB representatives from each organizational element will ensure that the appropriate subsystem manager, principal function manager, and/or flight function manager from each organization reviews each change for technical content and relevance of action requested by the change.

Changes which impact SSP budgets, SSP controlled milestones, element design control parameter(s) limits for the ISS mission specified in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1, or other SSP requirements shall be forwarded to the PRCB with a recommendation for disposition.

Additionally, baselining of Operational Increments (OIs) 3-year plan and date of formal OI Configuration Inspection (CI) shall be forwarded to the Space Shuttle PRCB with a recommendation for disposition.

The SASCB will review and approve changes to the SAIL test requirements and will additionally conduct a review of SAIL flight readiness on a mission basis. Any SAIL flight or laboratory element configuration change impacting an SSP requirement, or schedule milestone, and the associated funding impact will be processed through the Chief, Avionics Systems Division, Engineering Directorate, JSC to the SSP through the SASCB. Approval of the SAIL ICD addenda for the flight elements is delegated from the SASCB to the NASA SAIL Manager of the JSC Engineering Directorate (Avionics System Division).

The Chair, SASCB is responsible for approving changes to documents as indicated in Appendix F of this document. The CM procedures for the SASCB are documented in Appendices M, P, and X of this volume and in SASCB CR 89051, SASCB Space Shuttle Software Change Request Process.

4.3.2.3.3.2 Membership

The Chair, SASCB is responsible for approving changes to documents as indicated in Appendix F of this document.

- a. Chair
Manager, SSP Avionics and Software

b. Members

Representative, SSVE RMS Integration
Representative, Space Shuttle Systems Integration
Representative, Space Shuttle Projects, MSFC
Representative, Engineering, JSC
Representative, Flight Crew Operations (Astronaut Office), JSC
Representative, Mission Operations, JSC
Representative, Safety Reliability and Quality Assurance, JSC
Representative, Shuttle Processing, KSC
Representative, Payload Processing, KSC
Representative, Lockheed-Martin
Representative, United Space Alliance (Flight Software)
Representative, Boeing Reusable Space Systems (Flight Software)

4.3.2.3.4 Portable Onboard Computing Control Board (POCCB)

4.3.2.3.4.1 Authority and Responsibilities

The POCCB is the SSVEO controlling authority for Portable Onboard Computer (POC) hardware configuration, software integration, software configuration, and SSP POC hardware/software procurements. The POCCB will establish and maintain requirements for POC hardware configurations and software applications in compliance with the SSP POC policy in NSTS 07700, Volume II - Book 2, SSPD No. 138. The POCCB will address technical details, costs, and schedules with an integrated approach for operational concepts, hardware/software interfaces, system development, and utilization for POC. The POCCB is jointly chaired by representatives from the SSP Avionics and Software Office and Mission Operations Directorate (MOD) Portable Onboard Computing and Tools.

All proposed changes to SSP POC software applications, operating system and hardware shall be dispositioned by the POCCB prior to implementation. Changes which impact SSP budgets, SSP controlled milestones, or other SSP requirements shall be submitted to the PRCB with a recommendation for disposition. Additionally, significant changes which do not meet these criteria may also be forwarded at the discretion of the POCCB Chair. The POCCB utilizes the CM procedures in JSC 27891, Shuttle/Payload Configuration Management Plan for the Payload and General Support Computer (PGSC).

4.3.2.3.4.1.1 Authority

The POCCB has the authority to establish baselines, disposition proposed changes and resolve technical issues related to the following:

- a. SSP flight POC software loads (calculators, floppy disks, hard drives, etc.).
- b. JSC POC software code.
- c. NSTS 21000-IDD-PGSC(A), Payload and General Support Computer.
- d. Portable Onboard Computer Version Control Data Base/Document.
- e. JSC 27891, Shuttle/Payload Configuration Management Plan for Payload and General Support Computer.
- f. The Co-Chairs, POCCB are responsible for approving changes to documents as indicated in Appendix F of this document.

Board authority for the above items requires that proposals must have evaluations from all affected parties and be within established budgets and schedules.

The POCCB is the sole authoritative source for the as-flown configuration. POCCB approved software applications and media content shall be reflected in the Flight Data File (FDF) for each flight. The POCCB approved POC hardware configuration will be reflected in the CCCD.

4.3.2.3.4.1.2 Responsibilities

Direction and oversight responsibilities of this board relating to management and control of SSP POC hardware and POC flight software includes the following:

- a. Hardware configuration control requirements definition
- b. Hardware configurations definition and control
- c. Flight hardware certification requirements verification
- d. Hardware procurements
- e. Hardware maintenance
- f. Standard hardware services identification and provision
- g. Integrated POC support hardware list compilation and approval
- h. Software approval authority for all POC software to fly (except payload software)

- i. Mandatory evaluator of all POC related PIP, Flight Test and Supplemental Objectives Document (FTSOD), FRD, and FDF changes
- j. Software configuration control requirements definition
- k. Software validation requirements definition
- l. Software development standards/guidelines establishment
- m. Software media standards and compatibility requirements definition
- n. Supported commercial off-the-shelf software identification and procurement
- o. Generic (common) software services provision
- p. Software compatibility requirements establishment

4.3.2.3.4.2 Membership

- a. Co-Chairs
 - SSP Avionics and Software Office
 - MOD Portable Onboard Computing and Tools
- b. Secretary
 - Representative, MOD Procedures and Operations Group
- c. Members
 - Representative, Space Shuttle Customer and Flight Integration
 - Representative, SSVE Flight Crew Equipment Management, JSC
 - Representative, Flight Crew Operations Directorate (FCOD) (Astronaut Office), JSC
 - Representative, Mission Operations Directorate (MOD), JSC
 - Representative, MOD Space Flight Training Division, JSC
 - Representative, MOD Payloads Operations Branch, JSC
 - Lead, MOD POC Coordinators, JSC
 - Lead, MOD SpOC Programmers, JSC
 - Coordinator, MOD Flight Data File, JSC
 - Representative, Engineering Directorate (Avionics Systems Division), JSC
 - Representative, Safety, Reliability, and Quality Assurance Office, JSC

4.3.2.3.5 Flight Crew Equipment Configuration Control Board (FCE CCB)

4.3.2.3.5.1 Authority and Responsibilities

The Flight Crew Equipment CCB is the SSVEO controlling authority for establishing the configuration baseline for all IVA crew equipment used for the Shuttle Program and will establish the compatibility of IVA crew equipment hardware for Space Station.

The Flight Crew Equipment CCB is responsible for controlling all changes to this equipment that does not affect other programs/system elements. Changes which affect other system elements will be forwarded to the appropriate control board within the affected element. Changes which violate the element design control parameter(s) limits for the ISS mission specified in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1, shall be authorized by the PRCB. As a minimum, the Flight Crew Equipment CCB will control to the following requirements:

- a. SSP baseline requirements applicable to flight crew equipment
- b. Flight crew equipment specification requirements
- c. Flight crew equipment acceptance baseline configuration baseline

Flight Crew Equipment Core CCCD changes that do not affect other system elements or total core weight are delegated to the Flight Crew Equipment CCB as shown in Paragraph 4.3.2.1.1e. Flight Crew Equipment CCBDs for flight-specific CCCD requirement changes will be co-signed by the CCB Chair and the assigned flight manager delegated by the ICB. All changes affecting the SSP baseline, Paragraph 4.2 criteria, or any program/system element other than Flight Crew Equipment shall be forwarded to the Space Shuttle PRCB for disposition. The CM procedures for the FCE CCB are documented in MV5-01, FCE Work Instruction on Design Control.

4.3.2.3.5.2 Membership

- a. Chair

Manager, Space Shuttle Vehicle Engineering, Flight Crew Equipment
Management, JSC

- b. Secretary

Manager, Space Shuttle Vehicle Engineering, Flight Crew Equipment
Management, JSC

- c. Members

Representative, Space Shuttle Systems Integration
Representative, Space Shuttle Customer and Flight Integration
Representative, Space Station Program
Representative, Mission Operations Directorate, JSC
Representative, Engineering Directorate (Systems Engineering Office)
Representative, Engineering Directorate (Manufacturing, Material, and Process
Technology Division), JSC
Representative, Flight Crew Operations Directorate (Astronaut Office), JSC

Representative, Safety, Reliability, and Quality Assurance Office, JSC
Representative, Space and Life Science Directorate, Flight Crew Support
Division, JSC
Representative, SFOC (Flight Crew Equipment [FCE]/EVA)
Representative, SFOC (Orbiter)

4.3.2.3.6 Remote Manipulator System (RMS) Configuration Control Board

4.3.2.3.6.1 Authority and Responsibilities

Authority within the scope of this board includes configuration and design baselining and change approval of the RMS and SVS within functional and responsibilities limitations defined by the applicable interface control documents, and approved funding authority. Changes outside this authority will be forwarded to the VECB.

4.3.2.3.6.2 Membership

a. Chair

Manager, Remote Manipulator System Integration, JSC

b. Secretary

Remote Manipulator System Integration Office, JSC

c. Members

Representative, Space Shuttle Business Management (Contracts), JSC

Representative, Space Shuttle Business Management (Budget), JSC

Representative, Engineering Directorate (Automation, Robotics, and
Simulation), JSC

Representative, Flight Crew Operations Directorate (Astronaut Office), JSC

Representative, Mission Operations Directorate (EVA and Robotics Systems),
JSC

Representative, Safety, Reliability, and Quality Assurance (Safety and Mission
Assurance), JSC

Representative, Safety, Reliability, and Quality Assurance (Quality Engineering),
JSC

Manager, SVS Program, Neptec Design Group, Ltd., Canada

Manager, SRMS Program, Spar Aerospace Ltd., Canada

4.3.2.3.7 Orbiter Review Board (ORB)

4.3.2.3.7.1 Authority and Responsibilities

The ORB is a technical management review board chaired jointly by representatives of the SSVEO and the USA contractor with membership representing vehicle processing, logistics, and design center engineering. The ORB is responsible to perform a technical management review of requirements (OMRSD, IDMRD, etc.), nonconformances (waivers, exceptions, DRs, etc.), vehicle upgrades, new design/modifications, specific Orbiter-related topics and to provide a recommendation to the VECB for disposition.

4.3.2.3.7.2 Membership

a. Chair

Co-Chair: Engineering Directorate (Space Shuttle Chief Engineer), JSC

Co-Chair: Orbiter, Deputy Manager and Technical Director, USA

b. Secretary

USA

c. Membership

Manager, SSVE Operations Engineering

Manager, SSVE JSC Resident Office, KSC

Representative, Space Shuttle Systems Integration

Representative, Space Shuttle KSC Integration

Representative, Engineering (Space Shuttle Chief Engineer), JSC

Representative, Mission Operations, JSC

Representative, Flight Crew Operations, JSC

Representative, Safety, Reliability and Quality Assurance, JSC

Director, Process Engineering, KSC

Manager, Logistics Operations, KSC

Representative, Integrated Logistics, USA-KSC

Representative, Ground Operations, USA-KSC

Representative, Program Integration, USA

Representative, Boeing Reusable Space Systems (Orbiter)

4.3.2.4 (Deleted)

4.3.2.4.1 (Deleted)

4.3.2.4.2 (Deleted)

4.3.2.5 Mission Integration Control Board (MICB)

NOTE: Requirements modified and moved to Paragraph 4.3.2.2, Integration Control Board (ICB)

4.3.2.5.1 (Deleted)

4.3.2.5.2 (Deleted)

4.3.2.6 (Deleted)

4.3.2.6.1 (Deleted)

4.3.2.6.2 (Deleted)

4.3.2.7 (Deleted)

4.3.2.8 (Deleted)

4.3.2.8.1 (Deleted)

4.3.2.9 Space Shuttle Material Review System (MRB, PMRB)

4.3.2.9.1 Authority and Responsibilities

The Space Shuttle MR system, specified in NSTS 5300.4(1D-2), Section 1D506, provides for repair or disposition of nonconforming hardware, prior to government acceptance, which cannot or will not be returned to drawing/specification.

The SSP MR system will utilize the pre-acceptance process identified in NSTS 5300.4(1D-2), Section 1D506 for post delivery hardware. In the event of a conflict between NSTS 5300.4(1D-2) and the requirements in Paragraph 4.3.2.9 of this document, NSTS 5300.4(1D-2) shall take precedence only for the pre-acceptance process application.

The PMRB is the SSP technical review forum responsible for review and disposition of certain categories of hardware nonconformances, occurring during Space Shuttle

Vehicle processing at KSC and Orbiter Maintenance Down Period (OMDP) Processing which are not within the disposition authority of the program element/project MR system. The CM procedures for the PMRB are documented in Appendix Z of this volume and MK-UWI-11, Vehicle HW/SW Boards Integration Support. Nonconformances which have been dispositioned and approved by the PMRB shall not require the generation of a configuration waiver.

Summary reports of program element/project PMRB activities and dispositions shall be provided with significant topics, as determined by the PMRB Chair, briefed to the program element/project manager.

All changes which violate the ISS mission design control parameter(s) limits in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1, for a particular mission in KSC work flow shall be authorized by the PRCB.

4.3.2.9.1.1 MR Dispositions Requiring PMRB Review

Categories of MR dispositions which must be submitted to the PMRB are:

- a. Nonconformances affecting hazard analysis/safety of flight or mission success, performance decrease (greater than one payload equivalent lb.), extensive repair time or cost.
- b. Nonconformances affecting Criticality 1 or 2 failure modes as defined in NSTS 08126, Problem Reporting and Corrective Action (PRACA) System Requirements, Paragraph 3.2.1 and Appendix B.
- c. All restricted use dispositions for flight hardware.
- d. Deferred work and completion of modifications which are fully functional to a subsequent flow.
- e. Resolution of disagreements or elevation of concerns at the Material Review Board (MRB) level.
- f. Any changes to a previously approved PMRB disposition.
- g. Modular Auxilliary Data System measurement deferrals.

PMRB dispositions in the above categories will include hardware deferrals, restrictions, approvals to repair or use as-is, and recommendations to the PRCB for nonconformances which require waivers.

4.3.2.9.1.2 Hardware Restriction Categories for PMRB Disposition

All PMRB dispositions must include a statement of restriction using one or more of the following categories:

- a. "Unrestricted" use as is or as repaired: Unconditional acceptance - remaining nonconformance requires no further action, and implementing documentation can be closed.
- b. "Restricted Installation" use as is or as repaired: Conditional acceptance limited to the specified end item installation (e.g., vehicle or location) - remaining nonconformance is not interchangeable among similar end items, and implementing documentation can be closed.
- c. "Restricted Life" use as is or as repaired: Conditional acceptance of an interim disposition limited to a specified event, period of time, or number of flights/cycles - remaining nonconformance requires additional post-flight work, rework or evaluation, and implementing documentation must remain open and restricted.
- d. "Restricted Non-flight" use as is or as repaired: Conditional acceptance of an interim disposition limited to a specified non-flight event, period of time, or number of cycles for temporary workaround or support of ground operations - remaining nonconformance requires additional work, rework or evaluation, and implementing documentation must remain open and restricted.

Procedures for PMRB meetings, definition of format and distribution of dispositions, and PMRB action closeout are contained in Appendix Z.

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4.3.2.9.1.3 Requirements and Limitations

The following requirements and limitations apply to PMRB dispositions:

- a. All discrepancies dispositioned as acceptable for flight must have supporting rationale that component/system can perform its intended function and will not create additional risks to flight safety or mission success. Discrepancies dispositioned as acceptable must also not invalidate the basis for certification of the hardware/system. Discrepancies dispositioned as acceptable, but which result in reduction of hardware operational life expectancy below the hardware life certification, may be approved for appropriately restricted use by the PMRB. Items deemed to be significant to the program will be forwarded to the PRCB.
- b. Categories of “acceptable for flight” PMRB dispositions which must be forwarded to the PRCB are:
 1. Dispositions which invalidate the basis for certification of the hardware/system.
 2. Dispositions invalidating hazard controls, SSP critical processes, or CIL retention rationale for hardware designated Criticality 1, 1R, or 1S. Invalidation has not occurred if one of the following criteria apply:
 - (a) The requirement is not associated with verification of a critical characteristic affecting risk control.

- (b) It is determined that the intent of the requirement will be satisfied.
- 3. Any disposition which would preclude subsequent replacement of an interchangeable functional Line Replaceable Unit (LRU), e.g., valves, regulators, black boxes, etc.
- 4. Any disposition that violates the element design control parameter(s) limits for the ISS mission in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1.
- c. Dispositions which invalidate, on either a restricted or unrestricted basis, the flight configuration baseline (as-designed vs. as-built) must be traceable to part number, serial number in the applicable element project configuration accounting system. Appendix Z contains specific guidelines covering substitute hardware, interchangeability, design deficiency correction, invoked specification noncompliance, parts rework, and uninstalled hardware.
- d. The PMRB will ensure that recurrence control and corrective action requests or referrals are initiated as required. The PMRB will assign actions as required to correct problem disposition discrepancies or modify operating procedures.
- e. Concurrence by the cognizant element project managers' representatives on the board is mandatory for final dispositions (i.e., items not forwarded for approval to the PRCB). Element SRM&QA and subsystem/technical area managers' inputs will be coordinated on the PMRB by their respective element project office member of the PMRB.
- f. All dispositions of MR nonconformances after T-3 hours will be coordinated with the Mission Management Team.
- g. Dispositions to determine acceptability of modifications that have not been completed during a specified flow. This authority is limited to open tasks which do not compromise the functionality of the modification and which are formally documented as deferred nonconformances. All other incomplete modifications will require PRCB approval for deferral. A Change Action Request (CAR) will be processed to document the PMRB approval and update the authorizing PRCBD. This CAR will be processed outside the formal boards.

4.3.2.9.2 Membership

PMRB membership is shown below.

- a. Chair
Director, Process Engineering, KSC
- b. Secretary
Safety and Mission Assurance (Ground Operations), USA-KSC
- c. Members
Representative, Space Shuttle Customer and Flight Integration

Senior Representative, Space Shuttle KSC Integration, KSC
Chief, Quality Engineering, KSC
Manager, SSVE JSC Resident Office, KSC
Manager, MSFC Resident Office, KSC
Directors of Engineering, MSFC Element Contractors, LSS-KSC
Director, Safety and Mission Assurance, KSC
Director, Shuttle Engineering (Ground Operations), USA-KSC
Director, Safety and Mission Assurance (Ground Operations), USA-KSC
Director, Shuttle Integration, B-RSS, KSC
Director, Orbiter Engineering, B-RSS, KSC

4.3.2.10 L&L Software Change Control

4.3.2.10.1 Authority and Responsibilities

The L&L project at KSC is delegated program level controlling authority for Shuttle and payload Checkout and Launch (C&L) software, including LPS/ground operations aerospace language, CCMS, and Cargo Integration Test Equipment (CITE). The L&L project shall establish a control board structure responsible for conducting the C&L software configuration control process. Designated KSC control boards are authorized to disposition C&L software changes and nonconformances consistent with the requirements and limitations of Paragraph 4.3.2.10.2 and are responsible for assuring that items proposed for disposition are evaluated by all potentially affected elements. KSC control boards are responsible for: definition of C&L software and verification requirements, software configuration control, and acceptance/endorsement of C&L software for operational use. The CM procedures for the L&L Software Change Control are documented in SFOC BM332 and SP338.

Following STS-100/6A, the SSP will no longer be responsible for providing the data required by KSC to perform ground testing and verification of ISS. Exceptions will be given for hazardous commands, safety required inhibits, and data elements that have direct Shuttle interfaces.

4.3.2.10.2 Requirements and Limitations

The responsible KSC boards shall forward to the PRCB any proposed disposition which: does not have the concurrence of all affected projects/elements, impacts SSP element/project requirements including the element design control parameter(s) limits for the ISS mission in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1, budgets, schedules, or safety, defers implementation of program-directed changes, waives a program requirement, or would result in modifications to the mission-configured C&L software subsequent to MLP hard-down.

The L&L project shall prepare a C&L software configuration management implementation plan which defines the processes by which it will execute its responsibilities for C&L software configuration control and verification. The plan shall define delegations of responsibility to designated control boards, the membership of such boards, and the requirements and limitations by which delegated responsibilities are to be implemented. The initial C&L software configuration management implementation plan and subsequent proposed changes shall be submitted to the SASCB for review and approval.

4.3.2.10.3 Membership

Membership shall be defined in the C&L software configuration management implementation plan. Membership shall include Space Shuttle KSC Integration, and Safety, Reliability and Quality Assurance (SR&QA) (KSC) for purposes of evaluating and concurring on changes or nonconformances affecting Criticality 1, 1R, or 1S LPS software requirements and changes to command/data interfaces between the LPS and Shuttle hardware or software. Membership shall include a Space Shuttle Customer and Flight Integration representative for purposes of evaluating and concurring on changes or nonconformances affecting payload checkout and support. In addition, board membership shall include SSP project representatives. A project representative is required to provide evaluations and recommendations only to the extent that a proposed change would affect checkout or operation of the represented project's hardware or software.

4.3.2.11 Space Shuttle Upgrades Program Requirements Control Board (SSUPRCB)

4.3.2.11.1 Authority and Responsibilities

The SSUPRCB authority and responsibilities are listed below. This board shall utilize the configuration management process established in NSTS 07700, Volume IV, Appendix C. The Manager, Space Shuttle Program Development or designee is authorized to Chair the SSUPRCB. The SSUPRCB authority and responsibilities are as follows:

- a. Review and approve all upgrades to the Space Shuttle Program of \$5 million Estimated-at-Complete (EAC) or less.
- b. Review and forward to the PRCB all Space Shuttle upgrades greater than \$5 million EAC or which impact the major milestone schedule.
- c. Review and forward all Space Shuttle upgrades which potentially result in an increase in risk to the PRCB.
- d. Establish and control baseline budgets and schedules for upgrades approved by the PRCBs.
- e. Periodically review the status of each approved upgrade.

- f. Forward any study or change which violates the element design control parameter(s) limits for the ISS mission in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1, to the PRCB for authorization.
- g. Forward any change which violates program requirements to the PRCB for authorization.

4.3.2.11.2 Membership

- a. Chair
Manager, Space Shuttle Program Development or designee
- b. Secretary
Representative, Space Shuttle Management Integration
- c. Members
Representative, Space Shuttle Systems Integration, JSC
Representative, Space Shuttle Customer and Flight Integration, JSC
Representative, Space Shuttle Vehicle Engineering, JSC
Representative, Space Shuttle KSC Integration, KSC
Representative, Space Shuttle Business Management, JSC
Representative, Space Operations Management Organization, JSC
Representative, EVA Project, JSC
Representative, Engineering, JSC
Representative, Flight Crew Operations, JSC
Representative, Mission Operations, JSC
Representative, Safety, Reliability, and Quality Assurance, JSC
Representative, Space and Life Sciences, JSC
Representative, Shuttle Processing, KSC
Representative, Payload Processing, KSC
Representative, Logistics Operations, KSC
Representative, Advance Development and Shuttle Upgrades, KSC
Representative, Space Shuttle Main Engine Project, MSFC
Representative, External Tank Project, MSFC
Representative, Solid Rocket Booster Project, MSFC
Representative, Reusable Solid Rocket Motor Project, MSFC
Representative, Space Shuttle Project Office Upgrades Manager, MSFC
Representative, United Space Alliance

4.3.2.12 Portable Onboard Computing Control Board

NOTE: POCCB requirements have been moved to Paragraph 4.3.2.3.4.

4.3.2.12.1 (Deleted)

4.3.2.12.1.1 (Deleted)

4.3.2.12.1.2 (Deleted)

4.3.2.12.2 (Deleted)

4.3.2.13 Flight Crew Equipment Configuration Control Board (FCE CCB)

NOTE: FCE CCB requirements have been moved to Paragraph 4.3.2.3.5.

4.3.2.13.1 (Deleted)

4.3.2.13.2 (Deleted)

4.3.3 Project Boards

Project offices shall have and utilize internal detailed CM procedures that implement the requirements of this volume. In addition, project offices shall ensure their NASA in-house design activities/contractors have CM procedures that comply with the requirements of this volume and the project procedures. Any project change which violates the element design control parameter(s) limits for the ISS mission in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1, shall be authorized by the PRCB. Program delegations to the projects and the limitations associated with these delegations are shown in Paragraphs 4.3.2.1.1 and Appendix F of this volume. The CM procedures for the project boards are documented in their respective CM requirements' documents.

4.3.3.1 Orbiter Project CCB

NOTE: Orbiter Project CCB requirements have been moved to Paragraph 4.3.2.3.

4.3.3.1.1 (Deleted)

4.3.3.1.2 (Deleted)

4.3.3.2 (Deleted)

4.3.3.2.1 (Deleted)

4.3.3.2.2 (Deleted)

4.3.3.3 EVA Project CCB

4.3.3.3.1 Authority and Responsibilities

The EVA project CCB is the controlling authority for establishing the configuration baseline for all EVA activities associated with the Space Shuttle, Space Station, and

advanced programs. This includes all hardware - tools, Extravehicular Mobility Unit (EMU), tether, etc., and the training required for proper use of this equipment - required to accomplish EVAs from these vehicles.

The EVA project CCB is responsible for controlling all changes to this equipment that does not affect other programs/system elements. Changes which affect other system elements will be forwarded to the appropriate control board within the affected element. Changes which violate the element design control parameter(s) limits for the ISS mission specified in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1, shall be authorized by the PRCB. As a minimum, the EVA project CCB will control to the following requirements:

- a. Requirements necessary to implement SSP commitments for EVA
- b. EVA equipment specification requirements
- c. EVA equipment acceptance/certification baseline configuration

EVA-related core CCCD changes that do not affect other system elements or total core weight are delegated to the EVA CCB as shown in Paragraph 4.3.2.1.1e. EVA project CCBDs for flight-specific CCCD requirements changes will be co-signed by the CCB Chair and the assigned flight manager delegated by the ICB. All changes affecting the SSP baseline, Paragraph 4.2 criteria, or any program/system element other than EVA shall be forwarded to the Space Shuttle PRCB for disposition.

4.3.3.3.2 Membership

- a. Chair
Manager, EVA Project, JSC
- b. Secretary
Representative, EVA Project, JSC
- c. Members include, but are not limited to:
Representative, Space Shuttle Program, JSC
Representative, Space Station Program, JSC
Representative, Engineering Directorate, JSC
Representative, Flight Crew Operations Directorate, JSC
Representative, Mission Operations Directorate, JSC
Representative, Safety, Reliability, and Quality Assurance Office, JSC
Representative, Space and Life Sciences Directorate, JSC

4.3.3.4 Payload GFE CCB

NOTE: Requirements modified and moved to Paragraph 4.3.2.2

4.3.3.4.1 (Deleted)

4.3.3.4.2 (Deleted)

4.3.3.5 Space Shuttle Main Engine CCB

4.3.3.5.1 Authority and Responsibilities

The SSME CCB is the controlling authority for establishing the SSME configuration baseline and for controlling all changes to the SSME that do not affect the SSP baseline or other program/system elements. All changes affecting the SSP baseline, Paragraph 4.2 criteria, or any program/system element other than the SSME shall be forwarded to the Space Shuttle PRCB for disposition, except as delegated in Paragraph 4.2.4. As a minimum, the SSME CCB shall control to the following requirements:

- a. SSP baseline requirements applicable to the SSME
- b. SSME end item specification requirements
- c. SSME acceptance baseline configuration description

4.3.3.5.2 Membership

The SSME CCB will be chaired by the SSME Project Manager or deputy. The membership of the CCB will be designated by the CCB Chair so all organizations affected by CCB decisions will have a channel of representation to the CCB.

4.3.3.6 External Tank CCB

4.3.3.6.1 Authority and Responsibilities

The ET CCB is the controlling authority for establishing the ET configuration baseline and for controlling all changes to the ET that do not affect the SSP baseline or other program/system elements. All changes affecting the SSP baseline, Paragraph 4.2 criteria, or any program/system element other than the ET shall be forwarded to the Space Shuttle PRCB for disposition, except as delegated in Paragraph 4.2.1. As a minimum, the ET CCB shall control to the following requirements:

- a. SSP baseline requirements applicable to the ET
- b. ET end item specification requirements
- c. ET acceptance baseline configuration baseline

4.3.3.6.2 Membership

The ET CCB will be chaired by the ET Project Manager or deputy. The membership of the CCB will be designated by the CCB Chair so that all program organizations affected by CCB decisions will have a channel of representation to the CCB.

4.3.3.7 Solid Rocket Booster CCB

4.3.3.7.1 Authority and Responsibilities

The SRB CCB is the controlling authority for establishing the SRB configuration baseline and for controlling all changes to the SRB that do not affect the SSP baseline or other program/system elements. All changes affecting the SSP baseline, Paragraph 4.2 criteria, or any program/system element other than the SRB shall be forwarded to the Space Shuttle PRCB for disposition, except as delegated in Paragraph 4.2.3. As a minimum, the SRB CCB shall control to the following requirements:

- a. SSP baseline requirements applicable to the SRB
- b. SRB end item Specification requirements
- c. SRB acceptance baseline configuration baseline

4.3.3.7.2 Membership

The SRB CCB will be chaired by the SRB Project Manager or deputy. The membership of the CCB will be designated by the CCB Chair so that all program organizations affected by the CCB decisions will have a channel of representation to the CCB.

4.3.3.8 Reusable Solid Rocket Motor (RSRM) CCB

4.3.3.8.1 Authority and Responsibilities

The RSRM CCB is the controlling authority for establishing the RSRM configuration baseline and for controlling all changes to the RSRM that do not affect the SSP baseline or other program/system elements. All changes affecting the SSP baseline, Paragraph 4.2 criteria, or any program/system element other than the RSRM shall be forwarded to the Space Shuttle PRCB for disposition, except as delegated in Paragraph 4.2.2. As a minimum, the RSRM CCB shall control to the following requirements:

- a. SSP baseline requirements applicable to the RSRM
- b. RSRM end item specification requirements
- c. RSRM acceptance baseline configuration baseline

4.3.3.8.2 Membership

The RSRM CCB will be chaired by the RSRM Project Manager or designee. The membership of the CCB will be designated by the CCB Chair so that all program

organizations affected by CCB decisions will have a channel of representation to the CCB.

4.3.3.9 (Deleted)

4.3.3.9.1 (Deleted)

4.3.3.9.2 (Deleted)

4.3.3.10 Launch and Landing CCB

4.3.3.10.1 Authority and Responsibilities

The L&L CCB is the controlling authority for establishing the KSC projects baselines and for controlling all KSC projects changes that do not affect the SSP baseline or other program/system elements. All changes affecting the SSP baseline, Paragraph 4.2 criteria, or any program/system element other than the KSC projects shall be forwarded to the Space Shuttle PRCB for disposition. As a minimum, the L&L CCB will control to the following requirements:

- a. SSP baseline requirements applicable to the KSC projects
- b. Applicable KSC projects specifications

4.3.3.10.2 Membership

The L&L CCB will be chaired by the Director, Shuttle Management and Operations or designated representative. The membership of the CCB will be designated by the CCB Chair so that all program organizations affected by CCB decisions will have a channel of representation to the CCB and will include the Space Shuttle KSC Integration Office membership, United Space Alliance contractor, and Program Integration subcontractor participation. United States Air Force (USAF) Space Division, represented by the WSMC/ST will have membership on the L&L CCB. For changes that involve modifications of baselined Department of Defense (DOD) security requirements or the identification of new DOD security requirements, as defined by K-DOD-SM02, John F. Kennedy Space Center Space Transportation System Security Requirement/Implementation Plan, for DOD Missions, Air Force and NASA concurrence is required for action. In the case of a disagreement on changes that involve Air Force security, Air Force and NASA members will initiate elevation of the disagreement to the next higher levels of management, respectively, for joint resolution.

4.3.4 Directorate Boards/Panels

Directorate boards/panels are established as functional elements for specific hardware/software technical areas in support of the integrated Space Shuttle Program and

include SSP configuration management functions. The CM procedures for the directorate/boards panels are documented in their respective CM requirements' documents.

4.3.4.1 Crew Procedures Control Board (CPCB)

4.3.4.1.1 Authority and Responsibilities

The CPCB shall operate under the overall cognizance and authority of the Director, Mission Operations as an adjunct to the Space Shuttle PRCB. Specific authorities, responsibilities and procedures are documented in NSTS 07700, Volume VIII, Operations, Appendix L.

The Chair, CPCB is responsible for approving changes to documents as indicated in Appendix F of this document.

4.3.4.1.2 Membership

Members of the CPCB are defined in NSTS 07700, Volume VIII, Appendix L.

4.3.5 Joint Boards

4.3.5.1 Space Shuttle Program (SSP)/International Space Station Program (ISSP) Joint Program Requirements Control Board (JPRCB)

4.3.5.1.1 Authority and Responsibilities

The JPRCB is a joint SSP/ISSP board that is authorized by the ISSP/SSP MOA, NSTS 07700, Volume II - Book 3, Space Shuttle Program Structure and Responsibilities, Space Shuttle Program Interface Agreements, SSPIA No. 039, for the purpose of resolving joint technical and programmatic issues and/or the approval of joint program requirements, agreements (MOA, etc.), and milestones.

The JPRCB shall resolve issues and/or approve joint program baseline documents and changes such as requirements, agreements, schedules, and rules that are not delegated to lower authority. The JPRCB utilizes the CM procedures in Appendix C (PRCB process) and SSPIA 43, Memorandum of Understanding (MOU) between ISSP CM Office and SSP Mission Integration Office (MIO) and SSP Integration.

4.3.5.1.2 Membership

a. Co-Chairs

Manager, Space Shuttle Program

Manager, Space Station Program

b. Secretary

Manager, Space Shuttle Management Integration

c. Members

ISSP

ISS Manager for Operations, Space Station Program

ISS Manager for Technical Development, Space Station Program

Manager, ISS Mission Integration

Manager, ISS Payloads

Manager, ISS Safety and Mission Assurance

Representative, Boeing

SSP

Manager, Launch Integration

Manager, Space Shuttle Program Integration

Manager, Space Shuttle Systems Integration

Manager, Space Shuttle Vehicle Engineering

Director, Safety, Reliability, and Quality Assurance

Director, Shuttle Processing

SSP Program Manager, SFOC

ISSP/SSP - Dual Support

Director, Mission Operations

Director, Flight Crew Operations

Director, Engineering

Director, Space and Life Science

4.3.5.2 Space Shuttle Program (SSP)/International Space Station Program (ISSP) Joint Mission Integration Control Board (JMICB)

4.3.5.2.1 Authority and Responsibilities

The JMICB is a joint SSP/ISSP board that is authorized by the ISSP/SSP MOA, NSTS 07700, Volume II - Book 3, SSPIA No. 039 for the purpose of baselining joint documentation and/or dispositioning proposed changes and technical issues related to integration and operations that affect both programs.

The JMICB is the joint SSP and ISSP control board representing the control authority for changes to delegated mission integration requirements of the two programs. This board is delegated authority to initially baseline the following documents and disposition all proposed changes that do not affect other SSP or ISSP requirements, budgets, schedules, or risk. The JMICB utilizes the CM procedures in Appendix C (ICB process) of this volume and SSPIA 43, MOU between ISSP CM Office and SSP MIO and SSP Integration.

- a. MIPs and MIP annexes (except Annex 8, Launch Site Support Plan) subject to the following:
 - 1. Any MIP requirements impacting established SSP/ISSP budget constraints, KSC Shuttle/ISSP processing flow times, or requiring first-of-a-kind SSP/ISSP operations requires approval by the JPRCB.
 - 2. MIP agreements should not vary from established NSTS 07700, Volume XIV accommodations as specified in standard integration plans, NSTS 21000-IDD-ISS, Shuttle Orbiter/Space Station Interface Definition Documents and NSTS 07700, Volume XIV appendices. Mission design relating to crew operations must stay within NSTS 37326 constraints, and flight design requirements must stay within the standard Level B groundrules and constraints. Allowable variations not requiring JPRCB approval will be at the judgment of the co-chairs.
- b. Joint Integration Schedule (JIS).
- c. NSTS 21000-IDD-ISS.

NOTE: JMICB authority extends only to approval of PIRNs against this document

- d. All changes affecting other SSP/ISSP requirements, budgets, or schedules shall be forwarded to the JPRCB for disposition. The JMICB will act as the pre-JPRCB screening board for all changes to documentation which require JPRCB disposition. In addition, any unresolved SSP/ISSP change issues for which the JMICB has responsibility will be elevated to the JPRCB for resolution/disposition.

4.3.5.2.2 Delegation of Approval Authority

The JMICB will delegate limited authority to the joint Analysis and Integration Teams (AITs)/IPTs to disposition changes/issues for ICDs, annexes, JIS, and other joint documents. This delegation will require the concurrence of both Chairs.

4.3.5.2.3 Membership

a. Co-Chairs

Manager, Space Shuttle Program Integration or Designee
Deputy Manager, Space Station Technical Development, or
Deputy Manager, Space Station Operations Development

b. Secretary

Representative, Space Shuttle Management Integration

c. Members

The following or their designee will act as members:

ISSP

Manager, Space Station Vehicle
Manager, Space Station Utilization
Manager, Space Station Safety and Mission Assurance
Manager, Space Station Operations
Manager, Space Station Integrated Risk Management
Manager, Space Station International Partner
Representative, ISSA Prime Contractor

SSP

Manager, Extravehicular Activity (EVA) Project, JSC
Manager, Space Shuttle Business Office
Manager, Space Shuttle Systems Integration
Manager, Space Shuttle Customer and Flight Integration
Manager, Space Shuttle Vehicle Engineering, JSC
Director, Safety, Reliability, and Quality Assurance, JSC
Manager, Launch and Landing Projects, KSC
Representative, United Space Alliance

ISSP/SSP - Dual Support

Director, Mission Operations, JSC
Director, Flight Crew Operations, JSC
Director, Engineering, JSC
Director, Space and Life Sciences, JSC
Director, Payload Management and Operations, KSC

4.4 CHANGE PROCESSING

All proposed changes to the baseline must be properly documented, evaluated, coordinated, and dispositioned. Existing deviations, waivers, or exceptions shall be analyzed for impact when changes to existing hardware are submitted or when major modifications to flight hardware/software are reviewed. Only those deviations, waivers, or

exceptions against specific hardware components, subassemblies, assemblies or software equivalents affected by the change or major modifications shall be analyzed for impact. The following change proposal documentation and procedures shall be utilized.

4.4.1 Change Proposal Documentation

4.4.1.1 Contractor Change Proposal Documentation

All baseline changes proposed by the contractor requiring NASA approval shall be documented. The contractor may use their own format, but must provide, as a minimum, the following data:

- a. Change title, date, and Program Change Identification Number (PCIN) (assigned by the Space Shuttle PRCB Secretary).
- b. Change description.
- c. Change impact including violations to the element design control parameter(s) limits for the ISS mission in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1.
- d. Cost of Change (including cost per flight and cost impact).
- e. Effectivity.
- f. Effects on specifications, drawings, ICDs, etc.
- g. Justification and reason for the change.
- h. Description of impact or statement of no impact on hardware/software certification/verification. If certification/recertification is required, the proposed method (test, analysis, similarity) shall be identified.
- i. Schedule impact.
- j. Incorporation location.
- k. Impact on disciplines such as safety, reliability, quality assurance, test, operations, logistics, DOD STS secure operations, etc.

4.4.1.1.1 Post-acceptance Hardware Change Proposal Documentation

Changes proposed for incorporation in flight hardware after its acceptance (reference Paragraph 4.2) shall include, in addition to the above minimum requirements, specific identification of affected drawings. The list of affected drawings, together with the description of change, shall be sufficiently detailed to permit assessment of impact by the site responsible for change incorporation.

4.4.1.1.2 Post-design Freeze Hardware Change Proposal Documentation

Changes proposed for incorporation after the design freeze baseline (reference Paragraph 4.1.1) shall include, in addition to the above minimum requirements, a listing of affected:

- a. Engineering drawings
- b. Engineering materials and process specifications
- c. Engineering acceptance test specifications
- d. OMRSD, Master Measurement Data Base (MMDB), ICDs
- e. Spares

4.4.1.1.3 Change Classification Review

The program element/project offices shall assure that drawings and drawing changes released through the contractors engineering release system are properly classified as Class I or Class II (reference Paragraph 4.1) and that Class I changes are traceable to the contractor's change status accounting system.

4.4.1.2 NASA Change Proposal Documentation

All baseline changes proposed by a NASA design activity shall be documented on change proposal documentation. Existing formats may be used, if applicable, or new formats may be developed. This documentation must provide the same minimum data as specified in Paragraph 4.4.1.1. Changes requiring SSP action should be forwarded to the Space Shuttle PRCB Secretary on a SSP CR form as specified in Paragraph 4.4.1.3.

4.4.1.3 SSP CP Documentation

All SSP CPs to program documents shall be submitted to the appropriate board on specified SSP CP forms. Applicable program documents are listed in Appendix F of this volume. CPs to the PRCB shall be submitted on an SSP CR form (see Appendix C, Figure C-1). CPs to delegated boards are addressed in the respective board CM procedures in this volume. Exceptions to the specified forms for program document changes shall be authorized by the PRCB Secretary.

4.4.1.4 Request for Change Proposal Documentation

All requests for baseline change proposals from NASA design activities or contractors shall be documented. Existing formats may be used except as noted in Paragraph 4.4.1.3. This documentation must provide the following data as a minimum.

- a. Description of requested change.
- b. Justification and reason for the change.

- c. Impact (include cost and schedule, and description of impact, or statement of no impact, on hardware/software certification/verification. If certification/recertification is required, the proposed method [test, analysis, similarity] shall be identified).
- d. Desired effectivity.
- e. Interfaces affected.
- f. Identification of the NASA design activity/contractor from whom the change proposal is requested.
- g. Threshold exceedance data per Paragraph 4.2.

4.4.2 Change Proposal Pre-coordination

All NASA in-house design activity/contractor-initiated change proposals will be reviewed by the initiator to determine if interface requirements are affected. In those cases where it is determined an interface(s) is impacted by the change, the initiator shall, prior to submittal to NASA, coordinate the proposal with the affected NASA in-house design activity/contractor(s) and the SFOC Contractor. The NASA in-house design activity, the element contractor, or the SFOC Contractor shall prepare the required IRN and provide copies to each of the interfacing element design activities/contractors, who will reference and/or incorporate the IRN into its proposal. The design activity/contractors shall strive to achieve a mutually agreed to solution to the proposed change. The interfacing in-house design activity/contractor(s) will be requested through the NASA Project Office to submit an Engineering Change Proposal (ECP) to define what impact to hardware/software results if the IRN is approved. This allows NASA to receive, in a timely manner, the total impact associated with each proposed change. All NASA-initiated changes which are determined to impact interface requirements will be pre-coordinated between/among the applicable design activities/contractors prior to CCB action.

4.4.3 SSP Change Processing

All proposed SSP changes will be submitted, coordinated, reviewed, and dispositioned in accordance with the requirements of this paragraph. Documents ready for initial baselining also will be processed in accordance with these requirements. The proper change flow is shown in Figure 4-3.

4.4.3.1 Project Change Processing

Project changes will be documented in accordance with the requirements of Paragraphs 4.4.1.1 and 4.4.1.2. As shown in Figure 4-3, project changes will be submitted

to and dispositioned by the appropriate project CCB. Before approving a proposed project change, the project CCB Chair will assure that no other program element/project and no SSP requirement is affected by the proposed change. Project changes impacting the SSP baselines or another program element/project shall be dispositioned by the Space Shuttle PRCB. Emergency changes necessary to be implemented by a project immediately (before SSP review), shall be submitted by the project manager to the SSP within 48 hours, via a CR, with justification for the emergency action. Emergency cannibalization requests to prevent work stoppage may be submitted to the Space Shuttle PRCB via a Shuttle Project Action Request (SPAR) for final approval within 48 hours of project approval. Examples of emergency situations are those affecting immediate safety of personnel, facilities or test components; long term savings which require immediate go-ahead; and, unacceptable program schedule impacts if not implemented immediately.

4.4.3.1.1 Emergency Changes to Flight Hardware/Software

Program element/project offices shall establish procedures for the expeditious processing of mandatory make-work or compatibility change requirements necessary to resolve design problems encountered by the using organization. Expedited emergency change processing will be utilized when design problems may impact safety, the using organizations major test/operations schedule or program/project milestones. These procedures shall ensure change coordination, approval, engineering release, any special engineering instructions, and essential hardware delivery to resolve the immediate design problem. The procedures shall be based on a guideline of change disposition through "ready for installation" within 72 hours of initiation.

4.4.3.2 Space Shuttle PRCB Change Processing

CPs shall be submitted for PRCB processing on a CR form as described in this paragraph. An exception to this requirement may be CP forms used by delegated program element boards which are forwarded for disposition to the PRCB. Those forms may be used for PRCB processing at the discretion of the PRCB Secretary.

An SSP CR (see Figure C-1) will be prepared for each proposed change under the PRCB authority. The CR and directive will bear the identifier SXXXXXX in accordance with Paragraph 4.4.4. Detailed instructions for preparing the CR form are provided in Appendix C.

SSP change processing is shown in Figure 4-3 and Appendix C. SSP systems ICD change processing is described in Appendix D. SSP changes may be proposed to the Space Shuttle PRCB by any PRCB member. The SSP CR form and accompanying data shall be submitted to the PRCB Secretary before PRCB action is required. SSP payload ICD change processing is described in PDP MS3-001 and PDP MS3-007 per SFOC DRD 1.1.1.1f.

Upon receipt, each CR will be reviewed at a daily Change Review Group (CRG) meeting for urgency, classification (N/A-to-acceptance, prior-to-acceptance, post-acceptance), completeness, clarity, and relationship to other proposed and/or approved SSP changes. Any CR marked as a prior-to-acceptance change will be checked for design control weight/cost data inclusion. CRs without cost/weight threshold data per Paragraph 4.2, this document, will be returned to the submitter.

SSP CRs will be made available daily, with the exception of certain changes that are pre-coordinated and processed outside the formal Space Shuttle PRCB as described in Paragraph 4.4.3.2.2, by the PRCB Secretary, with supplementary instructions and background material as appropriate, for review by all Space Shuttle PRCB members. The tentative PRCB review date will be noted on each CR.

Prior to formal presentation at the Space Shuttle PRCB, the change package shall be evaluated for impact by each affected project or organization represented on the PRCB. PRCB representatives assigned a change requested code (\$) are encouraged to submit evaluations to the PRCB Secretary. Representatives not assigned a change requested code may also elect to submit an evaluation to the secretary. The correspondence transmitting each SSP CR will indicate the impact assessment desired. Impact assessment shall be provided using the program Change Evaluation (CE) form (see Figure C-4) in accordance with the instructions provided in Appendix C. The CE for each proposed change shall be provided to the Space Shuttle PRCB Secretary prior to the PRCB meeting for which that change is scheduled.

The direction of the Space Shuttle PRCB Chair will be provided on the Space Shuttle PRCBD (see Figure C-6), which will be prepared by the PRCB Secretary. PRCBDs will be uniquely identified by the same identifier as used for the CR.

4.4.3.2.1 Exceptions for Changes Requiring Immediate Attention

For emergency changes to flight hardware/software subsequent to acceptance review, the program elements/projects are delegated the authority to implement emergency changes in anticipation of Special Space Shuttle PRCB approval, after obtaining the concurrence of the project manager(s) responsible for the design of the affected Space Shuttle System element(s). Emergency changes are defined as follows:

- a. Readily reversible changes which do not involve programmatic impact and which must be made prior to the next Special Space Shuttle PRCB to avoid significant adverse effects to an operation and/or schedule. These changes will be reported and reviewed at the next Special Space Shuttle PRCB following the change initiation.
- b. A change required to correct a condition which, if uncorrected, could at any time result in fatal or serious injury to personnel or extensive damage to valuable property.

Other SSP changes requiring immediate attention to preclude an adverse programmatic impact will be processed as specified in Appendix K.

4.4.3.2.2 Outside the Board Changes

Changes may be processed and dispositioned outside the formal Space Shuttle PRCB when the following criteria are satisfied:

- a. The change does not affect changes in program costs, schedule, weight or performance, does not constitute the originating authority for hardware or software design change or modifications, but is required to update or correct program documentation consistent with established program baselines or to define the implementation for a change previously approved by the Space Shuttle PRCB.
- b. The change has been fully pre-coordinated, evaluated by all affected organizations, all impacts have been identified, and there is unanimous recommendation for approval.
- c. The change constitutes program direction that the Manager, Space Shuttle Program or Manager, Launch Integration, KSC determine should be expeditiously provided to implementing organizations without further evaluation.

For changes conforming to the criteria of Items a, b, or c above; as determined by the Space Shuttle PRCB Secretary based on review of the pertinent data and, as applicable, recommendation of the SSP CRG; the PRCB Secretary may prepare a Space Shuttle PRCBD for disposition by the PRCB Chair outside the formal PRCB. Changes processed to complete implementation of a previously approved change as described in Paragraph 4.4.3.2.2a shall contain a reference to the originating change in the "Related Changes" block and in the "Reason for Change" block of the SSP CR form.

All SSP CRs will be made available, in accordance with Appendix C, for review and evaluation prior to disposition by the Space Shuttle PRCB. CRs that conform to the above criteria are determined by the PRCB Secretary to have sufficient pre-coordination to identify all potential impacts may not require evaluation prior to disposition by the PRCB Chair. The Space Shuttle PRCBD for changes processed outside the formal PRCB will contain the following statement: "This PRCBD was processed outside the formal Space Shuttle PRCB".

4.4.3.2.3 Record Change

A change is defined as a "record" change when the following criteria are satisfied:

- a. The change is required to update or correct program documentation consistent with established program baselines or to define the design implementation for a previously authorized change.

- b. The change does not constitute the originating authority for hardware or software design changes or modifications.
- c. The change does not affect changes in program costs, schedule, weight or performance.

Review of record changes need not conform to the procedures described above, at the discretion of the Space Shuttle PRCB Secretary. PRCBDs, including revisions, for record changes may be signed by the Space Shuttle PRCB Secretary. Availability of these directives will be the same as all other PRCBDs.

4.4.3.2.4 Post-PRCB Approval

In cases where a change has been authorized by PRCBD without the defined revisions to the affected SSP baselined documentation being included, the following actions shall be initiated to assure the baseline is properly updated:

- a. Package SSP documentation revisions (“is” and “was”) on a supplemental SSP CR.
- b. Identify the SSP supplemental CR and process in accordance with Paragraph 4.4.3.2.2.

4.4.3.3 Space Shuttle ICB Change Processing

The ICB has two CP systems which may be used to process changes to documentation under its control. The first process is the PRCB change process which is detailed in Paragraph 4.4.3.2 of this volume and Paragraph 6.6 of Appendix C to this volume. This process is used for changes to program requirement documents which have been delegated to the ICB. The second process which is used is the ICB Change Request/ Directive (DIR) process which is detailed below in this paragraph in Paragraph 6.7 of Appendix C to this volume. This process is used for changes to payload integration documentation. ICB changes will be dispositioned either at an ICB, an IPT or Outside the Board (OSB).

An SSP CR form (see Figure C-1) or ICB CR/DIR (see Figure C-2) will be prepared for each proposed change under the ICB authority and will bear a unique identifier in accordance with Paragraph 4.4.4. Detailed instructions for preparing this form are provided in Appendix C. ICB changes may be proposed to the Space Shuttle ICB by any ICB member.

Prior to formal presentation to the Space Shuttle ICB, the change package shall be evaluated for impact by each affected project or organization represented on the ICB. The correspondence transmitting each ICB CR/DIR will indicate the impact assessment

desired. Impact assessment shall be provided in accordance with the instructions provided in Appendix C. The evaluation for each proposed change shall be provided to the change OPR prior to the ICB meeting for which that change is scheduled. The direction of the Space Shuttle ICB Chair or designee will be provided on the ICB CR/DIR when approved.

4.4.3.4 (Deleted)

4.4.3.4.1 (Deleted)

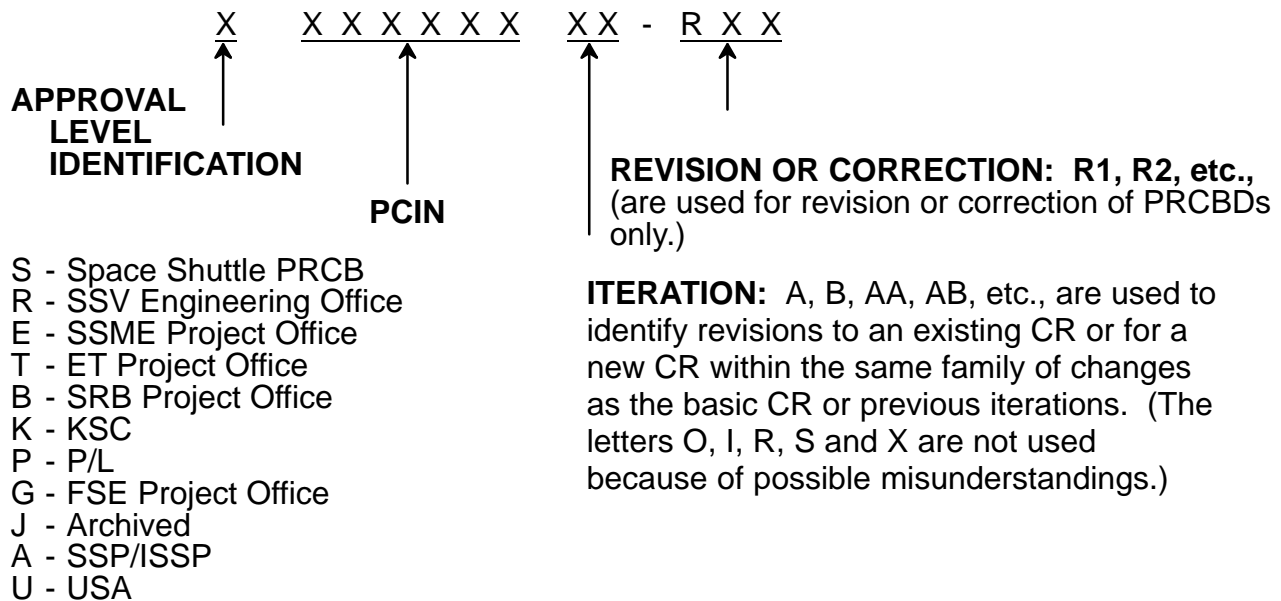
4.4.4 Change Identification Numbers

Changes submitted on CR forms shall have a PCIN. Changes submitted on other forms will have their own unique numbering system.

4.4.4.1 Program Change Identification Numbers

The SSP PRCB change process shall utilize a uniform system whereby all changes submitted on a CR form are assigned a PCIN. Changes submitted on other forms will have their own unique numbering system as described in the CM process reference document for each board. Prior to the submittal of a CR, the initiating NASA program element, project, prime contractor, element contractor, or in-house design activity/contractor shall obtain a PCIN from the NASA Space Shuttle PRCB Secretary. All forms which include data related to this CR shall utilize this number. This requirement applies to changes proposed by interfacing design activity/contractors. Each related proposed change and associated change paper is assigned the same PCIN, but may be classified as a particular iteration of that PCIN.

The PCIN is a six digit number with no significant information included. It is assigned by the Space Shuttle PRCB Secretary on request by authorized program, project or contractor personnel. Once assigned to a change, a PCIN will remain the same throughout the life of the program. All change paper related to a given change must reference this number for packaging purposes. Specific documentation resulting from a change (i.e., PRCBD, CCB, CR, TD, etc.) shall be assigned an identification by the originator. If the PCIN is not used as a "root", the only limitation is 14 alphanumeric characters. If the PCIN is used as a "root", the identifier shall be composed as follows:



All SSP CRs are originated by Space Shuttle PRCB members and will use the prefix “S” (Approval Level Identification) but will reference applicable project documents.

4.4.4.2 ICB CR Numbers

All changes dispositioned by the ICB via an ICB CR/DIR shall have an ICB CR number assigned prior to submittal of a proposed change. The ICB may also process CRs and PRCBDs with PCINs. The CR/DIR numbering scheme is documented in Appendix C, Paragraph 6.7.4.

4.4.5 Change Packaging

Prior to the processing of any proposed change for CCB action, the applicable CCB support function shall assure that the total proposed change is being reviewed. Prior to final disposition of any proposed change, the respective CCB shall assure that the total change has been reviewed. This will be accomplished through change packaging. Change packaging is the integrating and assembling of the total change documentation (changes to all affected documentation, spares, training equipment/devices, ICD changes, etc.). Pre-coordination with all affected organizations (Paragraph 4.4.2) aids this function.

Each change requiring Space Shuttle PRCB action will be packaged under one PCIN number with each package including, as a minimum, the following:

- a. The change proposal(s)/request(s).
- b. The disposition of the proposal(s)/request(s).

- c. The implementation direction to the party(ies) who implement the change.
- d. Documentation denoting acceptance of the direction.
- e. Other related documentation such as Software Change Requests (SCRs), IRNs, sketches, appropriate memorandums, etc.

4.4.5.1 Retrofit/Modification Changes (Installation Post-delivery)

Retrofit/modification work is the modification of an end item's physical and functional configuration identified and approved after acceptance and delivery.

Changes occurring after an acceptance and delivery which affect the baseline design configuration, but do not cause physical or functional modification of delivered hardware will not require the submission of Time Compliance Technical Instruction (TCTI). This includes such changes as part or assembly dash numbers caused by incorporating project approved Field Engineering Changes (FECs) or integrating project approved contractor changes into the design.

Retrofit/modifications (except for emergency/urgent changes originated at the using site) shall only be accomplished by TCTIs as specified in SL-T-0010, Preparation of Time Compliance Technical Instructions, for hardware changes and SN-S-0008 for computer software changes. Space Shuttle Vehicle Engineering is excepted from the requirement to provide TCTIs for hardware changes. Proposed changes shall be submitted as CRs by design activity/element contractors and shall provide the following as a minimum:

- a. Identification by kit title and reference to applicable drawings/documentation including modification kit part numbers.
- b. Identification of the responsible design agency and the site proposed for accomplishing the modification.
- c. Estimated man-hours/shifts for using site accomplishment of the modification.
- d. Date or event that modification work must be completed by: (flight, tests, scheduled milestone, technical constraints).
- e. Need dates and on-dock dates for material, engineering, etc., (coordinated with the accomplishing site prior to submittal of the CR).
- f. Resources (dollars/manpower) to be transferred from the initiating project/site to the project/site that is to accomplish the work.
- g. Effectivity.

Proposed changes will be pre-coordinated between the affected program elements/projects prior to design-responsible program element/project control board approval and subsequent SSP or delegated authority approval, as defined in Paragraph 4.2. Retrofit/modification installation verification and closure notices shall be provided as notification that a particular change has been accomplished in accordance with associated modification instructions. L&L project is excepted from the requirement to provide an Installation Notice Card (INC) for modification kits that provide hardware for mission equipment and do not require modification of delivered hardware.

Retrofit/modification incorporation status shall be maintained by the contractor. Closure verification shall be provided to the design responsible program element/project by the installing contractor for the program element/project.

4.4.5.2 Modification Packaging

CCB approved engineering changes which impact hardware/software Contract End Items (CEIs) shall include directions for installation after acceptance at any factory or field site. These modification packages shall provide the following as a minimum:

- a. PRCB/CCB directives
- b. CEI and serial number(s)
- c. Parts/material list
- d. Modification instructions
- e. Engineering requirements (drawing/engineering order)
- f. Completion and notification records
- g. Modification package identification with PCIN reference
- h. Installation location and recommended incorporation period
- i. Modification package hardware
- j. Spare action required
- k. Disposition removed/replaced parts
- l. Special tools/fixtures required
- m. Retest requirements as released engineering
- n. Operational/maintenance manuals affected
- o. ECP identification number

4.4.5.2.1 Partial Modification Packages

The utilization of partial modification packages shall be limited to those instances which dictate their use to satisfy schedule needs. When the contractor/design activity ships a modification package in the form of several partial kits, each partial shall include the data required by SL-T-0010 or SN-S-0008 to accomplish the partial installation and validation. The first partial package shall identify, to the extent possible, the total number of partial packages to follow and the last partial package shipped shall clearly identify that it is the last shipment for that modification package.

4.4.5.2.2 Shipment of Modification Packages

All contractor prepared packages including partials, shall be accepted by Form DD-250, signed by the NASA quality agency. When partials are shipped, or when a package is shipped with shortages, the contractor shall identify that it is a partial shipment and shall list all shortages on the accompanying Form DD-250.

4.4.5.2.3 Changes to Modification Packages at a Using Site

Minor make-work changes to modification packages prior to installation acceptance by a NASA representative shall not require a revision to the authorizing CR/ECP unless its written technical content requires a change.

Any change to a modification package subsequent to NASA acceptance of the package and prior to installation shall be provided as a supplemental package identified by the basic number with an added revision symbol. The package number(s), including any revision symbol(s), shall be recorded for each package/partial package installed on the retrofit change installation verification and closure notice to ensure accurate configuration accountability.

Changes to the modification package after they have been installed and their installation verified shall require a revision to the authorizing CR/ECP and submittal to the applicable project CCB and subsequently to the Space Shuttle PRCB for disposition as a new modification package.

New installation verification and closure notices shall be required for revisions to modification packages when the authorizing ECP is revised and any of the following apply:

- a. Additional serial number CEI effectivities are authorized for which installation verification and closure notices shall be completed for each additional modification package authorized.
- b. The ECP authorizes a change in modification package already installed and accepted by the using site.
- c. The revised ECP authorizes a change in the modification package requirements for a specific CEI serial number effectivity.

4.4.6 Identification and Control of Open Work

Open Work relative to Shuttle flight hardware/software and associated GSE that requires transfer/deferral from one program element/project to another program element/project will be controlled by the SSP as defined herein. This work is defined as follows:

- a. Preplanned/assigned work is Open Work planned for accomplishment at the using site because: (1) it is more desirable, from a program standpoint, that it be accomplished at the using site; (2) is deferred for safety reasons; (3) is required to restore the item from alterations/differences necessary for shipping; or (4) of deferral of current year expenditures to following years or to allow end item delivery schedules to be maintained even though component delivery schedules have been slipped.
- b. Unplanned/deferred work is the Open Work which is required to be accomplished prior to acceptance and delivery of the end item, but which will not be done because of parts shortages, lack of schedule time, etc.

4.4.6.1 Preplanned/Assigned Work Identification

Preplanned/assigned work includes that work required to configure the end items from the as-delivered configuration defined by the delivery acceptance data package of the end items to the configuration specified by engineering drawings, i.e., the flight configuration for Shuttle flight hardware/software or the design configuration for associated GSE. Preplanned/assigned work does not include work normally done at the using site. Preplanned/assigned work may be defined on: (1) SSP drawings, or (2) individual element flight configuration drawings for Shuttle hardware/software or design drawings, for associated GSE. As a minimum, identification of preplanned/assigned work shall be provided to the using site at least six months prior to end item delivery and baselined by the Space Shuttle PRCB at least three months prior to end item delivery. Changes or additions to the preplanned/assigned work baseline that are identified one month or less prior to the formal Acceptance Review of an end item shall be presented at the Acceptance Review and approved as specified in Paragraph 4.4.6.2. Each program element/project requesting preplanned/assigned work shall submit a SSP CR containing the following information, as a minimum:

- a. Identification by title and reference to applicable drawings/documentation for the item to be deferred.
- b. Reason for transfer/deferral.
- c. Identification of deferring manufacturing site and the accomplishing site.

- d. Estimated man-hours for using site accomplishment of the item.
- e. Delta program cost incurred by deferring the work, including cost per flight.
- f. Date or event that deferred work must be completed by: (flight, test, scheduled milestone, technical constraints).
- g. Need dates and on-dock dates for material, engineering, etc., coordinated with the accomplishing site prior to submittal of the CR.
- h. Resources (dollars/manpower) to be transferred from the deferring project/site to the project/site that is to accomplish the work.
- i. Effectivity.

4.4.6.2 Unplanned/Deferred Work

Work originally planned to be accomplished, but not completed at the manufacturing site, and any changes or additions to the preplanned/assigned work baseline that are identified one month or less prior to the formal Acceptance Review, will be presented at the Acceptance Review as a delta to the previously identified preplanned/assigned work. This list will be included in the Open Work section of the Acceptance Data Package (ADP). The responsible project manager or the designated representative shall approve flight hardware/software (unplanned/deferred) work by signing Certificate of Flight Readiness (CoFR) Statement No. 1. For GSE, SSP approval of unplanned/deferred work will be obtained by expedited CR submittal of data requirements in accordance with NSTS 07700, Volume IV - Book 1. Pre-coordination with the using site shall be accomplished.

The listing of unplanned/deferred work will include the information identified in Items a. thru i. below, plus identification of the systems invalidated by the unplanned/deferred work and the revalidation requirements.

- a. Identification by title and reference to applicable drawings/documentation for the item to be deferred.
- b. Reason for transfer/deferral.
- c. Identification of the deferring manufacturing site and the accomplishing site.
- d. Estimated man-hours for using site accomplishment of the item.
- e. Delta program cost incurred by deferring the work, including cost per flight.
- f. Date or event that deferred work must be completed by: (flight, test, scheduled milestone, technical constraints).

- g. Need dates and on-dock dates for material, engineering, etc., coordinated with the accomplishing site.
- h. Resources (dollars/manpower) to be transferred from the deferring project/site to the project/site that is to accomplish the work.
- i. Effectivity.

4.4.7 Change Tracking

All changes shall be tracked from initial notification of submittal (PCIN assignment) through CCB disposition, direction to and acceptance by the contractor, and installation verification. Each CCB shall assure that change tracking is accomplished.

4.4.8 Engineering Release Closeout

A technique must be established by the design activity/contractor whereby the detailed definition (engineering drawings) of an engineering change is declared complete and the release function will not allow any further release of engineering data (drawings, Engineering Orders [EOs], etc.) against that specific change. Any additional releases to the engineering change after that time can only be made after submittal to and approval by appropriate program element/project control board action. This does not preclude the use of FECs required to complete the installation of the approved modification.

4.4.9 Deviations and Waivers

Deviations and waivers shall be processed in the same manner as any other change, i.e., deviations/waivers shall be processed through the same change control system and dispositioned by the same level of authority that controls the requirement that is addressed by the deviation/waiver. Requests for deviation/waiver to SSP requirements shall be submitted to the Space Shuttle PRCB Secretary on a SSP CR in accordance with Appendix C. An exception to this requirement is NSTS 08171, File II, Volumes 2, 4 and 6 waiver/exception requests, which are submitted to the Manager, Space Shuttle Customer and Flight Integration Office, and NSTS 08171, File III (excluding Volume 41) and File IX (excluding Appendix B) waiver and exception requests which are submitted to the Manager, SSVEO in accordance with requirements specified in Paragraph 4.3.2.1.1d, of this document. When a waiver affects the same requirement which is specified in more than one paragraph/document within SSP requirements, only one waiver shall be processed, properly identifying all sources against which the waiver will be applicable. Flight hardware and GSE CIL deviations/waivers that require the approval of the Manager, Space Shuttle Program, shall be forwarded to the Space Shuttle PRCB Secretary for review by the appropriate Space Shuttle organizations.

A SSP change will be designated as a deviation when the change is submitted before the fact to request authorization to depart from a particular specification requirement. A

SSP change will be designated as a waiver when the change is submitted after the fact requesting authorization to use or accept an article or condition that does not meet specified requirements.

When a Space Shuttle directive is signed approving a deviation/waiver the affected SSP document shall be updated to reference and document the deviation/waiver.

- NOTES:
1. Exceptions to these procedures have been authorized for the documents identified in Appendix C, Paragraph 6.4.2
 2. Deviations/waivers of the requirements of NSTS 07700, Volume X - Book 1, Paragraphs 3.3.1.2.3.1.2, 3.5.1.1.1, 3.5.1.1.2, 3.5.1.1.3, and 3.5.1.2.1.1 shall be processed in accordance with NSTS 22206. In addition deviations/waivers of NSTS 08080-1, Manned Spacecraft Criteria and Standards, Standards 4B, 20A, and 32 (reference NSTS 07700, Volume X - Book 1, Manned Spacecraft Criteria and Standards Table 2.0) shall be processed in accordance with NSTS 22206.

4.4.9.1 Deviation/Waiver and Accepted Risk Safety Hazards CRs

Requests for approval of deviations, waivers, or accepted risk safety hazards shall be submitted to the Space Shuttle PRCB Secretary on a CR form (see Figure C-1) in the same manner as any other SSP change. When the change package is submitted to the CRG, an OPR will be assigned to provide a consolidated CE to the Space Shuttle PRCB Secretary, organizations that are required to submit mandatory evaluations will be designated, and the change package will be made available to the appropriate SSP organizations for evaluation. If there is unanimous recommendation from the evaluating organizations for approval of a deviation/waiver that does not include deviation/waiver of Criticality 1 or 1R failure modes, the PRCB Secretary may prepare a Space Shuttle PRCBD and submit it to the Manager, Space Shuttle Program for approval outside the formal Space Shuttle PRCB. If there are disagreements on the change, or if the change includes a request for deviation/waiver of Criticality 1 or 1R failure modes or approval of accepted risk safety hazards, the change shall be presented to the PRCB for disposition.

When a directive is signed approving a deviation/waiver the affected SSP document is updated to reference and document the deviation/waiver.

4.4.9.2 Deviation/Waiver of SRB Criticality 3 Hardware

The SRB CCB may disposition deviations/waivers for electrical connection and circuit board requirements for SRB/Advanced Solid Rocket Booster (ASRB) Criticality 3 hardware (including Development Flight Instrumentation [DFI]) whose failure will not:

- a. Affect any Criticality 1, 1R function
- b. Generate external debris during ascent
- c. Cause loss of a booster

4.4.9.3 Waivers to Launch with Known Anomalies

Anomalies which exist during ground flow processing that will not be corrected prior to flight shall be submitted on a SSP CR as a waiver or to the Space Shuttle PRCB as an In-flight Anomaly (IFA) closeout. Anomalies recognized as IFAs and closed out through the existing IFA procedures with a “fly as is” corrective action do not require a waiver. Existing IFA procedures require approval of the IFA closeout by the PRCB. All other anomalies that will not be corrected prior to flight shall be documented as a waiver and submitted for approval on a SSP CR.

Anomalies that exist prior to Orbiter rollover from the Orbiter Processing Facility (OPF) that will not be corrected for flight shall be documented as a waiver or as an IFA closeout prior to rollover. Those anomalies encountered between rollover and the FRR that will not be corrected for flight shall be documented as a waiver or as an IFA closeout prior to the FRR. Any anomalies that occur subsequent to the FRR that will not be corrected for flight still require a waiver or an IFA closeout prior to flight, however, each waiver or IFA will be expedited to ensure approval prior to launch.

Anomalies are defined in NSTS 08126, Problem Reporting and Corrective Action (PRACA) System Requirements.

4.4.10 Interface Change Control

After ICDs are baselined and implemented, changes will not be permitted without approval of the applicable CCB.

A proposed change originated by the design activity/contractor and affecting an ICD shall be prepared, pre-coordinated in accordance with Paragraph 4.4.2, and submitted as a proposed change/IRN to the applicable CCB.

The design activity/contractor that has responsibility for ICD preparation and maintenance will submit proposed IRNs. IRN processing and baselining shall be in accordance with Appendix D.

4.4.11 Interface Designation on NASA In-house Design Activity/Contractor Documentation

All design, engineering drawings, and any other documentation which describes the interface requirements defined by an ICD shall be clearly annotated by the NASA in-house design activity/contractor to specify that any proposed change to a drawing may

affect an interface and require formal configuration control processing. The following statement shall be entered on the first sheet of the drawing, etc., immediately above the title block: "This drawing/document contains information controlled by an ICD. Changes to information controlled by an ICD shall not be made prior to NASA configuration change control authorization". In addition, each page shall be imprinted with a distinctive stamp bearing the words "SSP Interface".

4.4.12 Effectivities

The SSP baseline requirements are developed for the total program. Exceptions for specific effectivities are identified and incorporated into the affected SSP documentation as specified in NSTS 07700, Volume IV - Book 1, Appendix C, Paragraph 6.4. Specific effectivities shall be identified on a SSP CR, Figure C-1, and shall be referred to within the change direction narrative of the Space Shuttle directive.

4.4.13 Criteria for Change Submittal to the Space Shuttle PRCB

4.4.13.1 (Deleted)

4.4.13.2 Post FRR Changes at KSC

4.4.13.2.1 Post FRR GSE/Facilities Changes Requiring SSP Authorization

The following GSE/facilities are subject to post FRR change control. Any post FRR GSE/facilities changes which impact flight hardware form, fit, or function must be authorized by the Manager, Space Shuttle Program, or designated representative.

- a. Unit interfaces directly with the flight vehicle either mechanically, electrically, or electronically (e.g., quick disconnects, cables).
- b. Unit contains components which directly control vehicle interface parameters with the vehicle (e.g., pneumatic consoles, power supplies).
- c. Equipment where hazardous fluid/gas or induced contamination can adversely affect flight hardware or create hazard to personnel.
- d. Protective covers are, in most cases, not included unless critical to integrated testing.

4.4.13.3 (Deleted)

4.4.13.3.1 (Deleted)

4.4.13.3.2 (Deleted)

4.4.13.4 (Deleted)

4.4.13.5 Interchangeability

Interchangeability is when two or more LRUs possess such functional and physical characteristics as to be equivalent in performance and durability and capable of being exchanged one for another without alteration of the items themselves or adjoining items except for adjustment and without selection for fit or performance. Functional and physical characteristics which would constitute interchangeability are:

- a. LRUs must have the same design envelope and have no use limitations imposed.
- b. LRUs must utilize the same attachments, mountings or mating surfaces. Attachments, connectors, wiring, GSE, and tubing must be the same to the extent that no rework is required on installation.
- c. LRUs must meet all baselined design requirements for performance. Performance or durability design requirements include the same safety, strength, electrical, mechanical, reliability, maintainability, tolerance, balance, and weight requirements.
- d. LRUs must have the same adjustments, testing, operation, and maintenance requirements and design to the extent that the same test procedures, specifications, and operating procedures may be utilized.

4.4.13.6 Special Daily Space Shuttle Program Requirements Control Board

4.4.13.6.1 Authority and Responsibilities

All changes to accepted flight hardware/software that are encompassed within the following criteria shall be submitted to the Special Daily Space Shuttle PRCB (reference Appendix N) for review and disposition:

- a. A flight hardware change that impacts assembly interchangeability (Paragraph 4.4.13.5).
- b. A flight hardware changeout that has no flight hardware interchangeability impact but which requires a flight software change directly attributable to the flight hardware changeout (e.g., LRU replacement requiring recalibration).

- c. Changes to accepted flight hardware/software that impacts:
 - 1. Other GFE
 - 2. Other Space Shuttle system hardware/software
 - 3. Mission Control Center hardware/software
 - 4. Simulator/trainer hardware/software
 - 5. NSTS 08171, except SSVEO delegated OMRSD (see Paragraph 4.3.2.1.1d for VECB and delegated OMRSD)
 - 6. Flight planning/profiles
 - 7. Flight crew procedures/training
 - 8. Safety
 - 9. Shuttle Avionics Integration Lab, except SSVEO controlled hardware
- d. Changes that impact hardware/software certification/verification.
- e. Changes to payload hardware/software after installation in the Orbiter.
- f. Nonstandard work not included in the above listed items or in other SSP base-line requirements such as the OMRSD, LCC, and SSP ICDs. Certain nonstandard work requested on a chit can be approved by the program element/projects and need not be submitted to this board except as specified in Paragraph 4.4.13.7.
- g. Changes associated with resolution of major program anomalies or incidents, or changes which are deemed as significant to the program.
- h. All non-payload requests for use of special test equipment and devices. All payload OMRSD noncompliances that impact vehicle schedule or safety. (Reference Paragraph 4.3.2.1.1d for all non-payload OMRSD noncompliances.)
- i. All LCC changes.

Changes which violate the element design control parameter(s) limits for the ISS mission specified in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1, shall be authorized by the PRCB. The CM procedures for the Special Daily PRCB are documented in Appendix N of this volume.

4.4.13.6.2 Membership

Organizations having PRCB membership, as defined in Paragraph 4.3.2.1.2, are responsible for participating in the Special Daily Space Shuttle PRCB meetings, and for

assuring that time critical decision-making and action item activities are supported in realtime with sufficient priority to avoid test and checkout schedule delays, to the maximum extent possible.

4.4.13.7 Use of JSC, KSC, and MSFC Request Forms (Chits) at the Launch Site

JSC, KSC, and MSFC Request Forms, often referred to as “chits”, may be used to request performance of nonstandard work by the launch site, i.e., special maintenance, inspections, and/or tests. Each project shall use the chit tracking system in the Baseline Accounting and Reporting System (BARS) data base (Appendix V, Paragraph 3.3). A closed-loop accounting system will be provided for all chits that affect flight hardware or systems. The closeout data will be posted in a timely manner to support CoFR. If the requirements on a chit cannot be fully satisfied or if implementation occurs earlier than specified by the program direction, the differences shall be documented in the chit response. A revision to the original chit is not required, provided the manager of the requesting organization and other affected organizations, as required, or their designated representative, concurs that the information provided in the closeout satisfies the intent of the baselined requirements. The requesting organization approval of the chit response will provide adequate documentation for chit closure in the closed-loop accounting system. The chits are also used by the launch site to request design agency assistance/instructions for troubleshooting/resolution of anomalous conditions encountered by the launch site and for concurrence by the design agency with troubleshooting procedures developed by the launch site. Chits shall not be used to direct or authorize configuration changes to the Space Shuttle flight or ground system hardware/software, except on a temporary basis, described below. Specifically the use of chits to request work on the Space Shuttle flight or ground system hardware/software shall be limited to the following:

- a. Chits that must be approved by the Space Shuttle PRCB with the implementation directed by a Space Shuttle PRCBD:
 1. Authorization to cannibalize hardware from one flight vehicle/element for installation in another flight vehicle/element provided the hardware to be cannibalized meets the interchangeability requirements of Paragraph 4.4.13.5 for both vehicles/elements. The request forms must contain:
 - (a) Action(s) taken to preclude cannibalization.
 - (b) Program effort to preclude a launch delay if approval is not granted.
 - (c) Action(s) taken to preclude future cannibalization of same item.
 2. Chits that are associated with a resource issue or serial milestone schedule impact.

3. Chits which invalidate the basis of hardware/system certification, CIL retention rationale, or hazard control.
4. Chits which affect more than the requesting and the receiving program element/project.
5. Chits that do not have the concurrence of the receiving project.
6. Chits which require work be performed on the Space Shuttle Vehicle (SSV) and which meet the following criteria:

ET, RSRM, SRB - Chits to be accomplished subsequent to the ET/SRB Mate or to be authorized subsequent to the ET/SRB Mate Review (CoFR 2).

SSME, Payload - Chits to be accomplished subsequent to the Orbiter Rollout/ET Mate or to be authorized subsequent to the Orbiter Rollout/ET Mate Review (CoFR 3).

- b. Chits that may be approved at the project level upon concurrence of both the requesting and receiving organizations with the implementation directed by the signature of the receiving project manager, or the SFOC Ground Operations APM for requirements to be performed at the launch site:
 1. To direct removal and replacement of LRUs in-flight vehicles only if the replacement LRU is interchangeable as described in Paragraph 4.4.13.5, with the LRU that was removed.
 2. Special maintenance, inspections, or tests to be performed on the flight hardware/software to troubleshoot/investigate known or suspected problems/anomalies.
 3. Response to requests for assistance in the resolution of problems/anomalies.
 4. Temporary configuration changes to the flight hardware for the purpose of performing fit checks, installation and removal of special test instrumentation including electrical cables to connect the test instruments, breakout boxes, alignment devices, etc., and temporary removal of items to perform inspections or investigate anomalies.

Request forms may be used to request temporary configuration changes when the change meets one of the following criteria:

- (a) The change is totally reversible, i.e., the flight hardware can be restored to its original configuration with no scar left by the temporary change, the change is for a specified limited application, and the request form directs restoration of the original configuration prior to flight.

- (b) The change is for a one-use test application, affects only one flight vehicle/hardware end item, is fully described by released engineering, and the request form specifies that the flight hardware be returned to the flight configuration described by the released engineering prior to flight.
- 5. To request special off-nominal processing procedures, e.g., special processing required as a result of vehicle configuration changes during flight.
- 6. Direction/authorization to ship delivered flight hardware or GSE from the launch site to another organization or facility except for the purpose of modification. If the hardware is to be shipped to another facility for the purpose of modification, the requirements of Paragraphs 4.4.1 and 4.4.13.6 shall apply.
- 7. Requests for information.
- c. Orbiter chits that do not violate the criteria in Item a. above, or the requirements of Paragraph 4.3.2.3.1 may be authorized by the SFOC contractor.

4.4.13.8 Use of Shuttle Project Action Requests

SPARs may be used to request and authorize implementation of delegated nonstandard work requirements and configuration changes as follows:

- a. SPARs which authorize emergency cannibalization requests to prevent work stoppage must be forwarded to the Space Shuttle PRCB for final approval within 48 hours of project approval.
- b. SPARs may be approved by the Shuttle Projects and SFOC Ground Operations APM as delegated in Paragraphs 4.2.1, 4.2.2, 4.2.3, 4.2.4, or 4.4.13.7b.

4.4.14 Program Freeze Point Reviews

Program freeze points are established at specific intervals during flight processing (reference NSTS 07700, Volume III). Program freeze points are defined as those points in time when the cargo, vehicle hardware and software, launch site flow and other key aspects of a flight have been defined and baselined. Subsequent to these points, only mandatory changes to the hardware, software or affected documentation will be permitted and will require Space Shuttle PRCB approval. Mandatory changes are those necessary to ensure crew/vehicle safety, mission success, and/or the accomplishment of primary subsequent freeze point schedules, including launch.

Program freeze point reviews are described below. For each freeze point review, the appropriate SSP element/project office shall provide and present that data for which they are the responsible, authoritative source.

4.4.14.1 Ascent Flight Design Freeze Point Review

An Ascent Flight Design Freeze Point Review shall be conducted to baseline the ascent trajectory criteria for the mission. After this milestone, changes to the ascent design or trajectory of this mission are not allowed without the approval of the PRCB.

The Ascent Flight Design Freeze Point Review shall be scheduled as a regular ICB agenda item. Significant items (such as use of a non-standard performance enhancement option) and unresolved discrepancies identified at the ICB shall be summarized and forwarded to the PRCB for presentation and disposition. The remainder of the ICB presentation shall be included in the PRCB package as backup material to be reviewed at the discretion of the PRCB Chair. The review shall result in the issuance of a PRCBD that will baseline and freeze the ascent design criteria to support the generation of final I-Loads and other flight design products during flight cycle. The presentation shall include but not be limited to the following items:

- a. A configuration and performance summary which includes a description of the mission, performance margins, mass properties, and propulsion systems.
- b. Ascent design criteria including performance status and a list of the performance enhancement options.
- c. A summary of the ascent issues.

4.4.14.2 Launch Site Requirements Reviews (LSRRs)

LSRRs shall be conducted to baseline mission specific operations and maintenance requirements, time and cycle actions, manifest engineering, and element hardware/software modifications and engineering to be accomplished during the launch site stand alone and integrated flow. To provide these requirements in synchronization with launch site processing activities, separate reviews shall be conducted to establish SRB/RSRM requirements, ET requirements, and integrated flow requirements for the remaining flight element projects. These reviews are designated as the RSRM Data-Pack Retrieval Review, the SRB PDTRs, the ET Pre-Ship Coordination Review, and the Integrated LSRR, respectively. The RSRM Data-Pack Retrieval Review, the SRB PDTRs and the ET Pre-Ship Coordination Review are project level reviews. For the Integrated LSRR, a change request and associated requirements data package shall be prepared and submitted for program review at least seven working days prior to the scheduled PRCB review date. To ensure timely submittal and adequate review of the CR and associated data package, LSRR inputs from each organization shall be submitted at least seven working days prior to the scheduled PRCB review date. The LSRR shall be scheduled as a regular PRCB agenda item and will receive preboard review of technical content by the Flow Review Working Group (FRWG). Significant

items and unresolved discrepancies identified at the FRWG shall be summarized and forwarded to the PRCB for presentation and disposition. The remainder of the FRWG presentation shall be included in the PRCB package as backup material to be reviewed at the discretion of the PRCB Chair. Each LSRR shall result in the issuance of a PRCBD to baseline the defined requirements. The data and presentation content are described below.

- a. Detailed modification weights for each element

4.4.14.2.1 (Deleted)

4.4.14.2.2 (Deleted)

4.4.14.2.3 Integrated Launch Site Requirements Review

An Integrated LSRR will be held prior to the LSFR to define flow processing requirements. For flows which include an OMDP, both OMDP and mission specific requirements will be provided at the Integrated LSRR. If an SRB/RSRM LSRR has occurred, only proposed changes since the SRB/RSRM LSRR shall be provided. ET and SSME modifications and nonstandard work which do not require PRCB approval shall be identified as such and presented for information only. The data and presentation content for the Integrated LSRR includes, but is not limited to the following items:

- a. A summary of issues identified as a result of an engineering evaluation of mission requirements and predicted performance margins for the mission.
- b. Mission and Payload summary.
- c. Flight and ferry flight mass properties summary.
- d. Systems Level Drawing status.
- e. ICD Open Work status.
- f. LCC Open Work status.
- g. Released RCN status.
- h. Flight software status.
- i. OMRS mission specific baseline.
- j. Waivers/exceptions summary.
- k. Authorized modifications.
- l. Authorized nonstandard work.

- m. Proposed flight hardware/software modifications, including the hardware status, engineering release status, Criticality, and any associated OMRS, ICD, and/or LCC changes.
- n. Proposed nonstandard work.
- o. Time/age/cycle life limited hardware requiring action.
- p. Summary of configuration differences from previous flights which are categorized as Criticality 1/1R or which impact launch site processing, i.e., changes being flown for the first time.
- q. Summary of previously approved Criticality 1/1R RCNs which have first flight effectivity on this flow.
- r. Payload integration equipment status.
- s. Detailed Test Objectives (DTOs) and Detailed Supplementary Objectives (DSOs) summary. DTOs and DSOs which affect KSC processing shall be identified.
- t. Open Work status for payload test and checkout (RCNs), hazards, and Core ICD.
- u. Identification of any items deemed significant to flow processing which require SSP resolution or, at the discretion of the appropriate project manager, require SSP appraisal.

4.4.14.3 Launch Site Flow Review

An LSFR shall be conducted to review and baseline launch site processing flow plans and schedules based on the requirements approved at and subsequent to the LSRR. A change request and associated data package shall be prepared and submitted for program review at least five working days prior to the scheduled PRCB review date. To ensure timely submittal and adequate review of the CR and associated data package, LSFR inputs from each organization shall be submitted at least seven working days prior to the scheduled PRCB review date. Whenever possible, the LSFR shall be scheduled as a regular PRCB agenda item and shall receive preboard review of technical content by the FRWG. The LSFR shall result in the issuance of a PRCBD to baseline the flow plans and schedules. The data and presentation content for the LSFR includes, but is not limited to the following items:

- a. Proposed changes to baselined requirements.
- b. Status of Open Work reported at the LSRR.

- c. Unresolved discrepancies between the OMRS baseline delivered at LSRR and the Operations and Maintenance Plan.
- d. Flow processing plans and schedules, and associated processing groundrules and assumptions.
- e. Deferred work summary.
- f. Vehicle and payload processing items and concerns.
- g. Interval OMRS requirements which were to be accomplished on the previous flow of the applicable Orbiter and are to be moved and accomplished on the planned flow.
- h. Identification of any items deemed significant to flow processing which require SSP resolution or, at the discretion of the appropriate project manager, require SSP appraisal.
- i. Baseline of software for Shuttle and payload checkout and launch operations.
- j. Detailed modification weights for each element

4.4.14.4 Delta Launch Site Flow Review

A Delta LSFR shall be conducted, when deemed necessary by the Manager, Space Shuttle Program, to rebaseline the launch site processing flow based on changes due to in-flight anomalies, in-flight checkout, post-flight inspections, and ferry activities. A CR and associated data package shall be prepared and submitted for program review at least five working days prior to the scheduled PRCB review date. To ensure timely submittal and adequate review of the CR and associated data package, Delta LSFR inputs from each organization shall be submitted at least seven working days prior to the scheduled PRCB review date. Whenever possible, the Delta LSFR shall be scheduled as a regular PRCB agenda item and shall receive preboard review of technical content by the FRWG. The Delta LSFR shall result in the issuance of a PRCBD to rebaseline the flow plans and requirements. The data and presentation content for the Delta LSFR includes, but is not limited to the following items:

- a. Proposed changes to baselined requirements.
- b. Status of Open Work and action items from the LSFR.
- c. A summary of in-flight anomalies and in-flight checkout requirements for the previous flight of the vehicle, including impacts to baselined requirements.
- d. Proposed changes to processing plans and schedules.

- e. Vehicle and payloads processing issues or concerns.
- f. Identification of any items deemed significant to flow processing which require SSP resolution or, at the discretion of the appropriate project manager, require SSP appraisal.

4.4.14.5 OMDP Requirements Review

An OMDP Requirements Review shall be conducted to review programmatic requirements associated with OMDP flows. The OMDP Requirements Review shall not be a requirements freeze point, but shall serve to provide the required program direction and commitment to ensure timely development and availability of OMDP related products. Detailed OMDP and mission specific flow requirements shall be provided at the Integrated LSRR (Paragraph 4.4.14.2.3). A CR and associated requirements data package shall be prepared and submitted for program review at least five working days prior to the scheduled PRCB review date. To ensure timely submittal and adequate review of the CR and associated data package, inputs from each organization shall be submitted at least seven working days prior to the scheduled PRCB review date. Whenever possible, the OMDP Requirements Review shall be scheduled as a regular PRCB agenda item and shall receive preboard review by the FRWG. The OMDP Requirements Review shall result in the issuance of a PRCBD to baseline the defined requirements. The data and presentation content for the OMDP Requirements Review includes, but is not limited to the following items:

- a. Mission/payload summary
- b. Systems Level Drawing status
- c. Released RCN status
- d. Flight software status
- e. Authorized modifications including the priority category as mandatory, turn-around enhancement, highly desirable, or opportunity
- f. Authorized nonstandard work
- g. Proposed requirements changes
- h. Summary of changes to three-year structural inspection requirements since the previous OMDP

4.4.14.6 Crew Compartment Configuration Review (CCCR)

The CCCR has been established to freeze the crew compartment configuration. This includes reviewing the CCCD in preparation for the final preflight release, baselining

plug-in plans for power, data, and video, and reviewing the final engineering analyses and hardware delivery status for the crew compartment. (For Mir flights, the descent configuration is not finalized until L-30 days.) After the CCCR, only changes to solve problems or discrepancies to the crew compartment configuration will be permitted at the delegated approval level as shown in Paragraph 4.3.2.1.1e of this document.

4.4.15 Program Milestone Readiness Reviews

Program Milestone Readiness Reviews are conducted at specific points during the Shuttle processing flow to ensure all completed activities, and remaining Open Work constraining the milestone, have been reviewed and approved. These incremental reviews, as defined in NSTS 08117, are described below.

4.4.15.1 ET/SRB Mate Readiness Review

The ET/SRB Mate Readiness Review shall be conducted before the mate of the ET to the SRB. This review shall encompass the completed hardware, GSE and facilities activities, the remaining Open Work required for ET/SRB mate, and the integration of those elements on the MLP.

4.4.15.2 Orbiter Rollout/ET Mate Readiness Review

The Orbiter Rollout/ET Mate Readiness Review shall be conducted before rollout of the Orbiter from the OPF. This review shall encompass the completed hardware, payloads, GSE, and facilities activities, and remaining Open Work required for Orbiter Vehicle transfer to the Vehicle Assembly Building, Orbiter/ET mate, and the integrated vehicle transfer to the pad.

4.4.15.3 Flight Readiness Firing (FRF) Readiness Review

The FRF Readiness Review shall be conducted before the FRF. This review shall encompass the completed hardware, software, payloads, GSE and facilities activities, and the remaining Open Work required for FRF.

4.4.15.4 Ferry Readiness Review

The Ferry Readiness Review shall encompass completed hardware and support equipment activities, and the remaining Open Work required for ferry from the landing site to KSC.

4.4.15.5 Flight Readiness Review

The FRR shall be conducted approximately two weeks before flight. This review shall encompass the completed hardware, software, and support facilities activities, and the

remaining Open Work required for flight of the Space Shuttle Vehicle, flight crew, and payloads.

4.4.15.6 L-2 Day Readiness Review

The L-2 Day Readiness Review shall be conducted two days before flight. This review, which functions as a delta FRR, shall encompass the completed activities, and the remaining Open Work required for flight of the Space Shuttle Vehicle, flight crew, and payloads.

FIGURE 4-1
CONFIGURATION CONTROL LEVELS

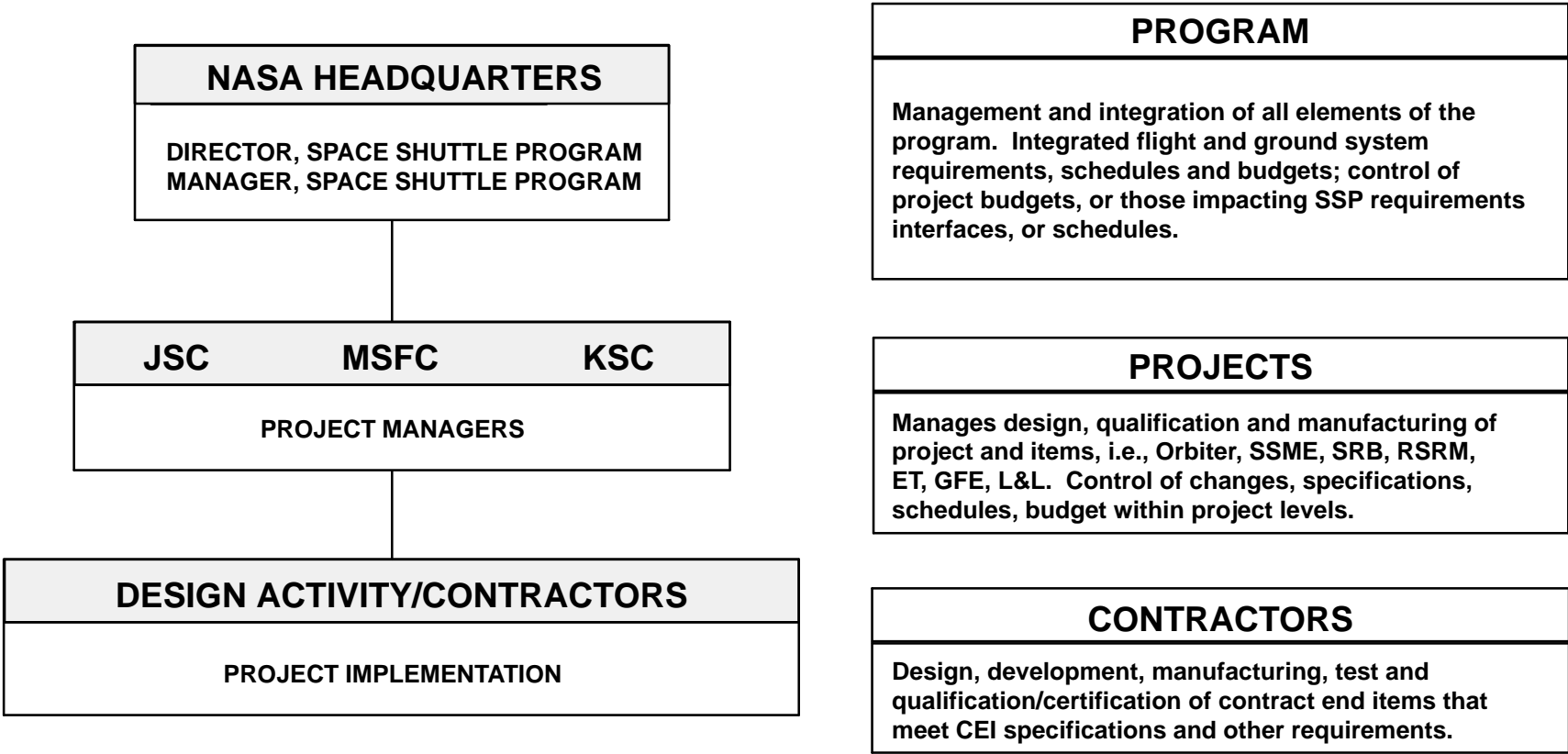
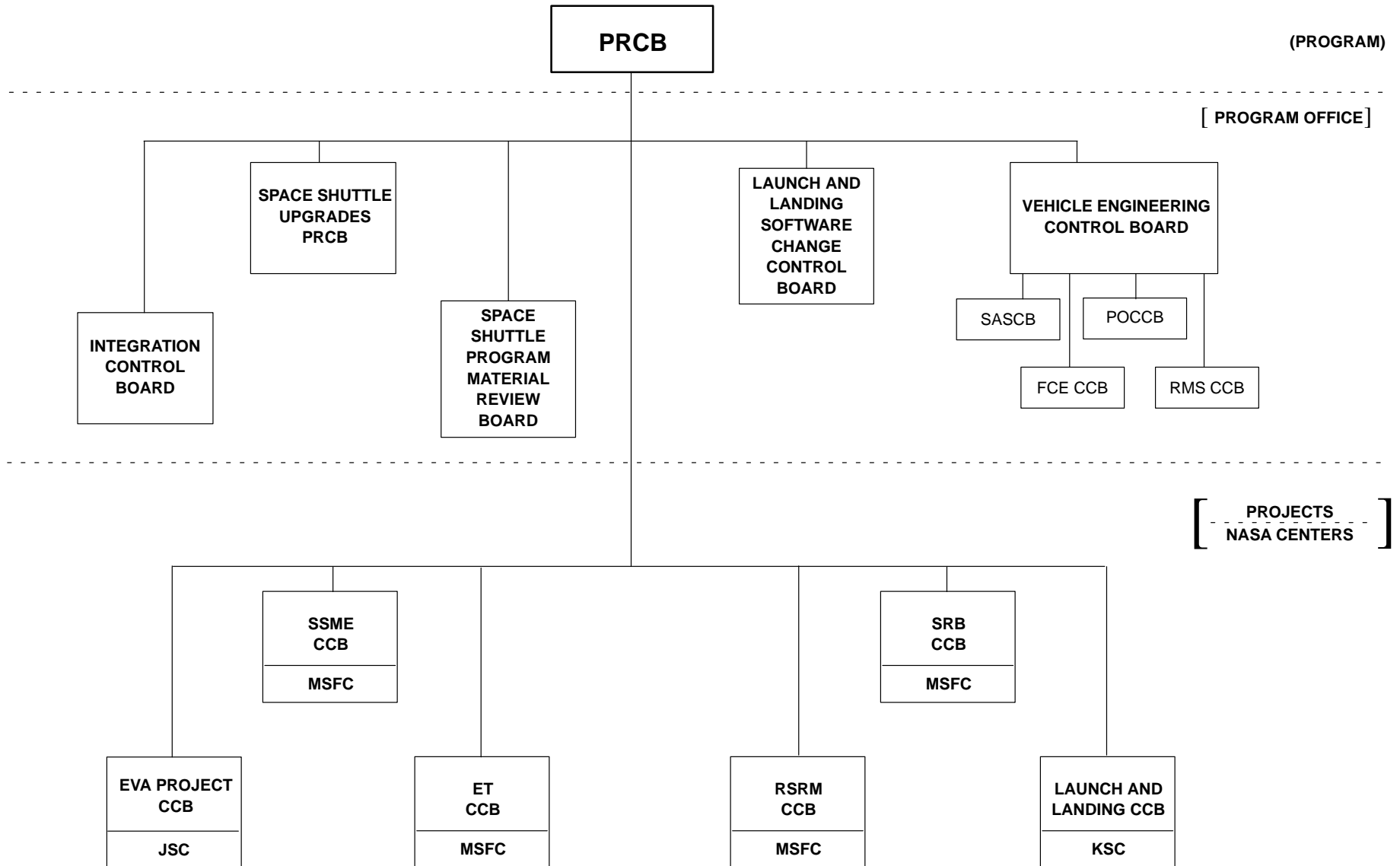
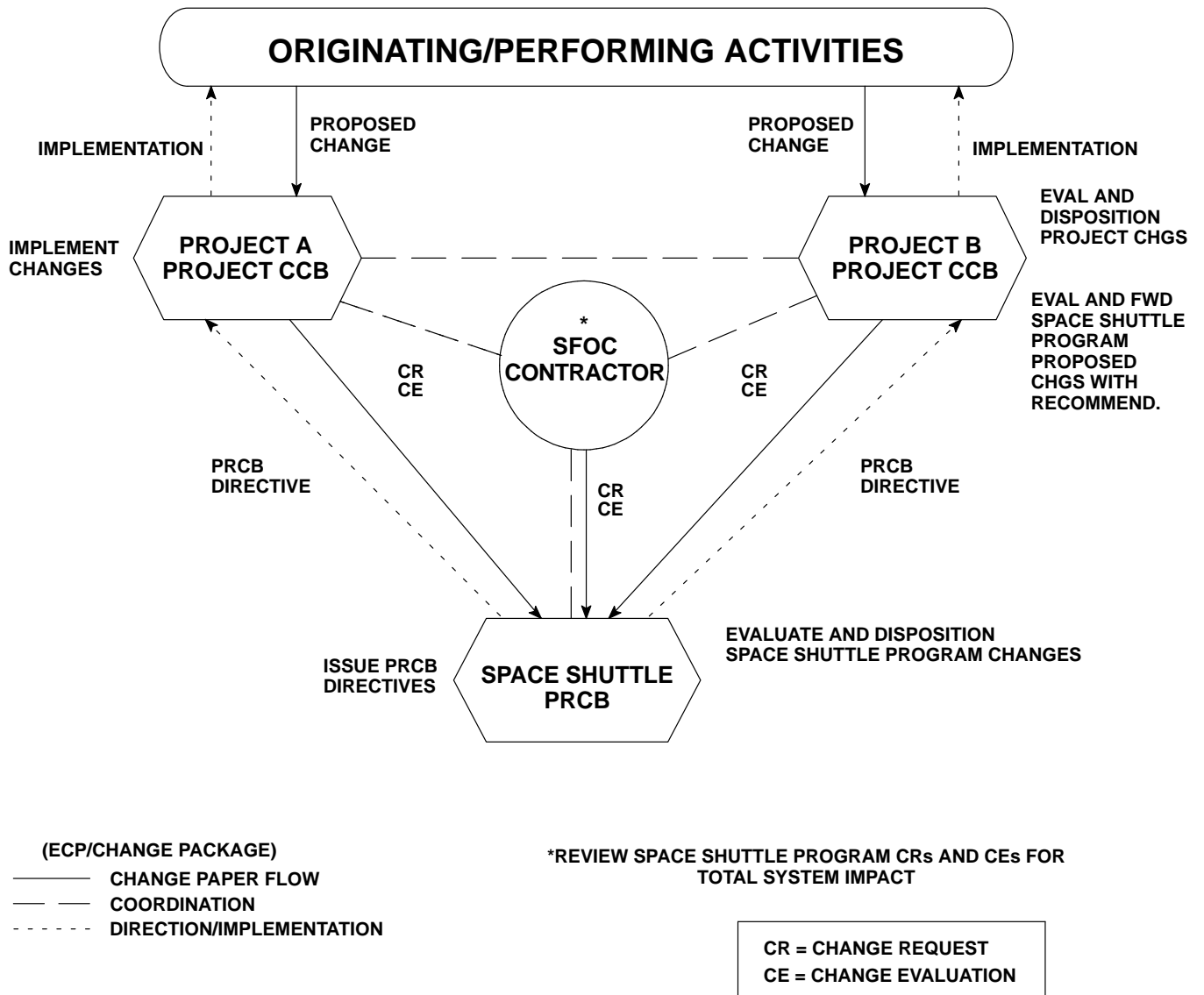


FIGURE 4-2
SPACE SHUTTLE PRCB/CCB STRUCTURE



PRCB – PROGRAM REQUIREMENTS CONTROL BOARD
CCB – CONFIGURATION CONTROL BOARD
CCP – CONFIGURATION CONTROL PANEL

FIGURE 4-3
SPACE SHUTTLE PROGRAM CHANGE FLOW



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5.0 CONFIGURATION ACCOUNTING

Configuration accounting is the element of CM that provides the essential records and reporting of precise configuration data for all Space Shuttle hardware/software. The primary objectives of configuration accounting are as follows:

- a. To maintain and disseminate the current configuration data of each program/project element.
- b. To maintain correlation among the configuration data for various equipment, software, and support elements.
- c. To maintain current and accurate records of the status of changes completed and in process.

The configuration accounting system shall include the task of maintaining, storing, and correlating configuration documentation of all hardware/software. This includes activities required to receive inputs from the design activity release desk (as-designed), quality control (as-built), and other sources (i.e., as-tested, as-qualified, as-delivered, as-flown, etc.); and to compare, summarize, and produce configuration summaries, differences, and other comparison data as may be of value to various program organizations.

The SSP, each program element/project and each design contractor shall maintain configuration records for current and past configurations of all configuration controlled hardware, (including flight hardware and GSE), software and procedures (including flight rules and crew procedures). These records shall include both as-designed and as-built configuration data. These configuration records shall be able to define at any point in history the approved configuration of the hardware, software or procedures. These records which currently exist, shall be maintained for the life of the Shuttle Program.

The program and the design contractor shall maintain the configuration records for current and past configurations of all Orbiter mission configurations. These records shall include both as-designed and as-installed configuration data. These configuration records shall be able to define, at any point in history, the approved configuration of the hardware, software or procedures. These records shall be maintained for the life of the Shuttle Program.

The SSP, each program element/project and each design contractor shall maintain certification records for current and past configurations of all controlled hardware and software. These records shall be maintained for the life of the Shuttle Program.

5.1 ICD CROSS-REFERENCE SYSTEM

Each design activity/contractor shall maintain a system that indicates which engineering drawings are affected by SSP and project ICDs. This system will allow the designer or

other affected parties to determine which drawings and/or ICDs may be affected by a proposed change.

5.2 SPACE SHUTTLE INTEGRATED PROGRAM ICD STATUS

The SSP shall utilize the NASA Open IRN Report and the Historical IRN Report which reside in the TDMS 2 data base. Current and historical data, including latest ICD revision and IRN incorporation are available on-line in TDMS 2.

The SSP shall utilize the payload PIRN/IRN Report which resides in the Automated Mission and Payload Tracking System (AMPTS) for current payload ICD information.

5.3 (DELETED)

5.4 CONFIGURATION STATUS REPORTING

Configuration accounting and verification functions shall maintain or have access to complete and accurate records on the location and configuration status of all Contractor Furnished Equipment (CFE), GFE, and commonality items of equipment. The records will include such data as nomenclature, manufacturer's identification, required and scheduled delivery dates for modification kits, planned and actual usage of each serial number, and additional notes as required.

Records will be monitored by each project on the status of changes being managed by the project. These records will enable an audit trail to be accomplished, from acceptance of each CR through verification of change implementation. The records will include a cross-reference to the following, where required:

- a. CRs
- b. Change proposals
- c. NASA CCBs
- d. Baseline documentation status
- e. ICD status
- f. Technical directives
- g. Contract Change Authorization (CCA) (if applicable)
- h. Retrofit/modification kits

Status accounting reports will be used to support acceptance and delivery of hardware/software as well as reviews and inspections.

The foregoing elements of data (as a minimum) shall be maintained by the design activity/contractor and shall be a product of the configuration accounting system. Appropriate summaries, evaluations, and status reports will be prepared from this data for submittal to the NASA as required.

5.5 MISSION EQUIPMENT CONFIGURATION ACCOUNTING

Mission equipment installation requirements for each Space Shuttle flight are specified in the MECSLSI drawing and the CCCD for that flight. The configuration accounting system which shall be used to track mission equipment assets, status compliance with the MECSLSI and CCCD drawing requirements and provide associated reports is defined in Appendix R.

5.6 MISSION-ESSENTIAL SOFTWARE DATA RETENTION

Mission-essential software elements (General Purpose Computer [GPC], SSME, LPS and Mission Control Center [MCC]) shall retain as-flown software configurations (executable code, mission-unique data, and related documentation) for a minimum of three years. Refer to NSTS 07700, Volume XVIII - Book 3, Computer Systems and Software Requirements, Software Management and Control, Book 2, Allocation of Simulation Functions, for further details.

5.7 VEHICLE/ELEMENT ASCENT PERFORMANCE AND WEIGHT FOR THE ISS MISSION

- a. Element weight/performance data shall be reported monthly to the PRCB as follows:
 1. Status of all performance enhancements
 2. Integrated performance assessment against the generic ISS Performance Reference Mission (PRM)
 3. Project comparison of status versus control weight (parameter)
 4. Project overview of all approved and anticipated design changes
 5. Provide cumulative weight growth estimate based on recorded Orbiter weight and CG following each OPF flow.

NOTES: 1. Only those projects with changes during a particular month will be required to report.

2. The flight element projects are not required to report on MRB weight change activities after hardware delivery to KSC.

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6.0 CONFIGURATION VERIFICATION

Configuration management includes activities associated with assuring that requirements are properly implemented and hardware/software is certified as having been designed and built to the correct configuration. Existing deviations, waivers, or exceptions shall be analyzed for impact when changes to existing hardware are submitted or when major modifications to flight hardware/software are reviewed. Only those deviations, waivers, or exceptions against specific hardware components, subassemblies, assemblies or software equivalents affected by the change or major modifications shall be analyzed for impact. This effort shall be an intrinsic part of the overall management approach on the program.

6.1 SSP REQUIREMENTS VERIFICATION

The SSP, having authority for the development and control of the NASA baseline, shall ensure that all external agency requirements and interfacing requirements between program elements/projects have been properly incorporated into the baseline. Requirements, design, and hardware/software configuration reviews will be conducted as necessary to ensure that this is accomplished. These reviews also will be used to establish baselines for further development of requirements and to validate the approaches taken to the solution to these requirements. The reviews considered to be SSP requirements are defined in the following subparagraphs.

6.1.1 Program Requirements Review (PRR)

This review encompasses all major SSP participants and is chaired by the Manager, Space Shuttle Program, or delegated representative. The purpose of the review is to review and update program requirements and evaluate the management techniques, procedures, agreements, etc., to be utilized by all participants. This review evaluates CM procedures and formats required to satisfy the program requirements.

6.1.2 Shuttle System Requirements Review (SRR)

This review encompasses all major SSP participants and is chaired by the Manager, Space Shuttle Program, or delegated representative. The purpose of this review is to update the program and system requirements to be utilized by the contractors for the SSP. These requirements are documented as the NASA SSP baseline (reference Paragraph 3.1.4), implemented with the contractors, and placed under configuration change control.

In addition to the system requirements, other program element requirements may be reviewed and evaluated to ensure they conform to the system requirements and that contractors have correctly interpreted the NASA requirements for the program elements.

Prior to or at the SRR, ICD responsibilities will be defined and documented and master schedules for ICD completion will be established.

6.1.3 Preliminary Design Reviews (PDRs)

PDRs will be conducted by each responsible NASA project office with their NASA in-house design activity/contractor, prior to, or very early in the detail design phase. The PDR is a technical review of the basic design approach for configuration items and for selected major changes to these items to assure compatibility with the SSP and project requirements (including interface requirements) and the producibility of the design approach. Cost and schedule relationships also will be reviewed. This review will update the project requirements to be utilized by the NASA in-house design activities/contractors for the applicable project. These requirements, including those contained in the Statement of Work/Requirements, shall be documented as the NASA project baseline, implemented with the NASA in-house design activity/contractor, and placed under configuration change control. In the event project requirements have been baselined prior to PDR, they will be updated as required to incorporate the applicable results of the PDR.

All ICDs applicable to a PDR should be baselined to reflect appropriate interface requirements prior to PDR completion. When any PDR is completed, all applicable ICDs must be baselined and implemented with the affected contractors and placed under configuration change control.

Typically, the items for review at the PDR should include the following:

- a. Preliminary ICDs
- b. Design analyses
- c. Layout, general arrangement, and envelope drawings
- d. Schematics and block diagrams
- e. Sizing, trade study, and design study results
- f. Material and process specification listings
- g. Applicable procurement specifications
- h. Test requirements
- i. Mockups and models
- j. Updated plans, procedures, and schedules
- k. Commonality candidates; identification, rationale, and status
- l. Proposed additions to the NASA baseline
- m. Selected SR&QA documentation (FMEAs, CILs, hazard analyses, etc.)

The PDR should result in the authorization to the contractor to proceed with further design in accordance with the reviewed design approach, interface requirements, commonality items, etc., and approval or update of the project baseline documentation.

NOTE: NASA approval of or concurrence with the NASA in-house design activity/contractor's design is not to be construed as divestiture of the contractor's basic design responsibility.

Designated program personnel (including representatives from projects other than the specific one being reviewed) will participate in the project PDRs. Such participation will partially satisfy the need for a system PDR, especially in the area of assuring compliance with SSP requirements. Provisions shall be made to convene a Space Shuttle PRCB subsequent to the project PDR (if required) to disposition SSP issues emanating from the project PDR.

Each project element shall provide and coordinate, prior to implementation, an overall plan with the Space Shuttle Management Integration Office. These plans shall delineate the "what," "when," and "how" for scheduling, conducting, and follow-up on the individual reviews.

In addition, the specific plans for each individual significant review (e.g., PDRs for Orbiter, ET, SRB, SSME, RSRM, LPS and Shuttle Carrier Aircraft Modifications) will be coordinated with the Space Shuttle Management Integration Office prior to formal release. The Management Integration Office will review and coordinate the plans with other affected organizations, especially the portions referring to representation by SSP and other project personnel on teams and boards, documents/drawings/mockups/ICDs/ plans to be reviewed/approved, and Review Item Disposition (RID) groundrules, flow plan, and follow-up activities.

6.1.4 Critical Design Reviews (CDRs)

CDRs will be conducted by the responsible NASA project office with their in-house design activity/contractor when the detailed design is approximately 90 percent complete for configuration items and for selected major changes to these items. The purpose of the CDR is to determine the compliance of the completed design with the NASA requirements.

All ICDs applicable to a specific CDR should be updated to reflect appropriate design solutions prior to CDR completion. When a CDR is completed, all applicable ICDs must be properly updated and implemented with the affected NASA in-house design activity/contractors and placed under configuration change control. The data to be incorporated shall be left to the discretion of the applicable project manager.

Typically, the items for review at CDR include the following:

- a. ICDs
- b. Detailed design drawings
- c. Design analyses and reports
- d. Test data
- e. Procurement specifications
- f. Mockups and models
- g. Prototypes, breadboards, models
- h. Material and process specifications
- i. Commonality hardware status reports
- j. Program procedures and schedules
- k. Proposed additions to the NASA baseline
- l. Selected SR&QA documentation (FMEAs, CILs, hazard analyses, etc.)

The CDR should result in authorization to the NASA in-house design activity/contractor to complete design release to manufacturing of all engineering drawings, the approval of test procedures, etc., and the appropriate revision or update of the project baseline documentation.

NOTE: NASA approval of or concurrence with the NASA in-house design activity/contractor's design is not to be construed as divestiture of the contractor's basic design responsibility.

Designated program personnel (including representatives from projects other than the specific one being reviewed) will participate in the project CDRs. Such participation will partially satisfy the need for a system CDR, especially in the area of assuring compliance with SSP requirements. Provisions shall be made to convene a Space Shuttle PRCB subsequent to the project CDR (if required) to disposition SSP issues emanating from the project CDR.

Each program element/project shall provide and coordinate, prior to implementation, an overall plan with the Space Shuttle Management Integration Office. These plans shall delineate the "what," "when," and "how" for scheduling, conducting, and follow-up on the individual reviews.

In addition, the specific plans for each individual significant review (e.g., CDRs for Orbiter, ET, SRB, SSME, RSRM, LPS and Shuttle Carrier Aircraft Modifications) will be coordinated with the Space Shuttle Management Integration Office prior to formal release. The Management Integration Office will review and coordinate the plans with other affected organizations, especially the portions referring to representation by SSP

and other project personnel on teams and boards, documents/drawings/mockups/ICDs/ plans to be reviewed/approved, and RID groundrules, flow plan, and follow-up activities.

6.1.5 Incremental PDRs and CDRs

Each review; i.e., PDR and CDR will be a one-time review of either the overall design approach or the detail design with review results presented to a formal NASA board. However, in order to allow design of the vehicle system and its various subelements to proceed in the most efficient manner and to allow initiation of long lead-time procurement and/or manufacturing to best support program requirements, review and authorization for individual subsystems of a system element design may be granted on an individual basis. As the NASA in-house design activity/contractor proceeds with system, element, or subsystem design, the NASA will monitor design progress. When the NASA in-house design activity/contractor and NASA agree that the design of a hardware element or subsystem has progressed to the point where it is appropriate to proceed with detail design or to release detail design for manufacturing, an incremental review will be conducted to obtain NASA's authorization to proceed. The incremental reviews will be conducted in accordance with the requirements of Paragraphs 6.1.3 and 6.1.4 herein. Upon completion of the incremental design reviews and resolution of resulting action items, the NASA baseline shall be approved and/or updated as appropriate.

The PDR and CDR (reference Paragraphs 6.1.3 and 6.1.4) shall include summaries of any incremental PDRs and CDRs to assure that the incremental reviews are compatible and the results satisfy program requirements.

6.1.6 Space Shuttle System PDR/CDR

The Space Shuttle System PDR/CDR board, chaired by the Manager, Space Shuttle Program or delegated representative, is conducted following the completion of a series of individual PDRs/CDRs.

The Shuttle System PDR/CDR shall consist of an end-to-end review of the Shuttle subsystems across all project elements. Primary attention shall be given to system level operation and function, with emphasis on the review by the flight crew, flight operations, data systems, launch operations, and recovery operations organizations.

The principal materials to be reviewed are:

- a. Integrated schematics
- b. Integrated system operations and overall timeliness
 1. Prelaunch
 2. Launch and ascent

- 3. Orbit
- 4. Entry
- 5. Approach and landing
- 6. Turnaround
- c. System level issues and tradeoffs
- d. Open interface problems and resolutions
- e. Element interface level FMEAs, CILs, and hazard analyses
- f. Commonality issues

6.1.7 Design Certification Reviews (DCRs)

DCRs, chaired by the Manager, Space Shuttle Program, or representative, shall be conducted following the system CDRs and prior to the readiness reviews for designated activities. DCRs may also be conducted for major design changes as determined by the Manager, Space Shuttle Program. The purpose of the DCRs is to certify the design of the Space Shuttle System and to evaluate the results and status of the verification planning, testing, and analysis. These reviews will include the results of the operation and performance analysis for the total Space Shuttle flight and ground system. Detailed planning for the DCRs will be a SSP function under the Manager, Space Shuttle Program.

6.1.7.1 Return-to-Flight DCR

The return-to-flight DCR shall review the results of the Design Requirements Review (DRR) and compare it with the Space Shuttle System verification status. Reverification of all requirements in NSTS 07700, Volume X, which have been previously verified, shall be completed for this DCR. New requirements resulting from the DRR or other program reviews shall be verified. Any requirement verification which is deferred because the requirement is not essential for return-to-flight shall be completed prior to the Shuttle flight for which that requirement is applicable. The SSP verification status will be made available by the elements and the L&L sites in the form directed by NSTS 07700-10-MVP-01, Shuttle Master Verification Plan, Volume I, General Approach and Guideline, Paragraph 4.1.

6.1.7.2 Return-to-Flight DCR Documentation Repository

All SSP elements/projects participating in the return-to-flight DCR shall develop and retain a repository of the return-to-flight DCR documentation and verification data. Documentation in the repository shall be organized and indexed so it is retrievable to

support management decisions for flight or major test readiness. The elements that must establish a repository are:

- a. Space Shuttle Systems Integration Office, (for Systems Integration and Flight Software documents)
- b. Space Shuttle Vehicle Engineering Office
- c. RSRM/SRB Project Offices
- d. ET Project Office
- e. SSME Project Office
- f. Mission Operations Directorate, (for Mission Operations and Support Facilities documents)
- g. Shuttle Processing Directorate, (for L&L site documents)
- h. Space Shuttle Systems Integration Office, (for Payload Mission Equipment documents)
- i. Flight Crew Operations Directorate, (for Shuttle Carrier Aircraft [SCA] and Shuttle Training Aircraft [STA] documents)

The documentation to be placed in the repository shall include, but not be limited to:

- a. SSP DCR Board Presentations and Reports
- b. Project DCR Board Presentations, Reports, Minutes, Actions and Action Closure Documentation
- c. Project DCR Preboard Minutes, Actions and Action Closure Documentation
- d. Project DCR Technical Review Team Data Packs, RIDs and Team Minutes
- e. Verification and Certification Documentation

6.1.8 Configuration Inspection

Configuration Inspections will be accomplished by the respective project office. These CIs shall be conducted on the first flight article, ground support systems, and flight and ground system software. For similar units delivered subsequent to the conduct of CI, a list of approved and unapproved configuration differences from the CI unit(s) will be supplied at the acceptance review for each unit. Test articles intended for integrated tests, such as integrated avionics test, etc., shall be compared to the CI unit(s) and differences identified and documented as part of the CI record. The purpose of this

review(s) is to establish the product configuration for each system element. This is basically accomplished by a comparison of the as-built configuration to the as-designed requirements and identifying and resolving any differences. The CI review(s) for each item of Category I commonality hardware will be conducted by the project office responsible for the development of the hardware, in conjunction with the user project office. The data to be reviewed at CI will, as a minimum, consist of the ADP, prepared in accordance with SN-D-0007, Acceptance Data Package Requirements (hardware) or SN-S-0008, the outputs of the configuration accounting and verification system, open item, engineering, manufacturing, test, and quality control records as required. The NASA in-house design activity/contractor's documentation approach, systems, and discipline shall assure this configuration documentation adequately and accurately describes the configuration. Upon successful completion of this review(s), the NASA baseline will completely describe the configuration of the particular system element being reviewed (as-tested and/or as-delivered configuration). This review allows the NASA to ascertain the exact configuration of each system element at the review date.

The review(s) may be conducted incrementally and may be conducted at any location required to facilitate adequate reviews.

6.1.8.1 Software Deliverable Data Package

Software deliverable data packages shall be submitted for each deliverable configuration item. The specific data which shall accompany the configuration item at time of shipment and data package preparation instructions are defined in SN-S-0008.

6.1.9 Acceptance Reviews

A detailed CI (see Paragraph 6.1.8) will be conducted and the results presented to the Manager, Space Shuttle Program prior to formal acceptance by the NASA of each major end item of deliverable hardware/software. This includes the test articles intended for major integrated tests. In the event of a time delay between the CI and end item acceptance, a review will be held to ensure, as a minimum, that all changes to the end item configuration from the last CI have been properly identified, documented, approved, and implemented in end item hardware/software. The combination of the CI and acceptance reviews will formally establish and document the exact detailed configuration of each item of hardware/software at the time of acceptance by the NASA. The acceptance configuration of each test article will be used among other requirements to certify readiness for the major integrated tests to be conducted. These reviews also will ensure that the documentation in the ADP, prepared in accordance with SN-D-0007, or Deliverable Data Package (DDP), prepared in accordance with SN-S-0008, correctly identifies the accepted end item configuration. The Acceptance Reviews may be conducted incrementally upon approval of the appropriate SSP/Project Manager. Upon

completion and as part of the Acceptance Review, endorsement of NSTS 08117 will be executed by the contractor and by the NASA. Subsequent to an end item's initial CI and Acceptance Review and prior to transfer from the organization that possesses the end item to another organization (contractor, project, major test management office, etc.), a review will be held and appropriate documentation included in the ADP or DDP. Any preplanned/assigned and unplanned/deferred work associated with an item being subjected to an Acceptance Review shall be presented at the review and also shall be presented to the Manager, Space Shuttle Program for approval per Paragraph 4.4.6.1 and 4.4.6.2. Issues/concerns derived from this work transfer/deferral shall be brought to the attention of the Manager, Space Shuttle Program.

6.1.10 Readiness Reviews

6.1.10.1 Commit-to-Flight

The final steps in configuration verification for a specific flight are conducted as a part of the commit-to-flight review process which consists of a series of reviews and readiness polls structured to incrementally assess progress toward readiness for flight. The review process is incrementally updated through endorsements of the CoFR and polls of the key NASA and contractor managers. The commit-to-flight process consists of four major reviews (five when FRF is dictated). These are ET/SRB Mate Review, Orbiter Rollout/ET Mate Review, FRR, and Launch Minus Two (L-2) Day Review. These incremental CoFR reviews are defined in NSTS 08117 and NSTS 07700, Volume VIII.

6.1.10.2 Test Readiness Review (TRR)

A TRR will be conducted prior to initiating major integrated (combined element) ground tests, such as:

- a. Shuttle Integrated Avionics Test (JSC-SAIL)
- b. Flight Readiness Firing (reference NSTS 07700, Volume VIII)
- c. Test hardware and support equipment verification status (FRF only)

A delta TRR will be conducted when the test article has been subjected to major configuration changes.

The TRR Board will be chaired by the Manager, Space Shuttle Program or designated representative. The purpose of this review will be to verify that the test article, facilities, support equipment, instrumentation and test procedures comply with requirements and are ready to achieve test objectives.

The following subjects will be included in the TRR agenda and evaluated:

- a. Test operations
- b. Major problems, test procedure inconsistencies and corrective actions
- c. Configuration changes since test article acceptance, open items, deviations and waivers, and limited life equipment status
- d. Facility and instrumentation readiness

6.1.10.3 (Deleted)

6.1.11 Ground Support Equipment (GSE) Design Reviews

These reviews will be conducted by the responsible NASA project office with their in-house activity/contractor for all GSE requirements and designs in accordance with SW-E-0002, Ground Support Equipment General Design Requirements. Approvals shall be obtained during formal meetings designated as Requirements Reviews (RRs), PDR, and CDRs. Material to be reviewed for each of these meetings shall be made available prior to the meeting. RR and PDR may be conducted simultaneously. Listed below are requirements for the GSE reviews:

- a. Requirements Review - The following information shall be presented at a Requirements Review:
 - 1. Ground system requirements which are allocated to the end item.
 - 2. A brief functional description of the GSE, including estimated size and weight.
 - 3. An estimated schedule delineating quantity, design completion, fabrication completion, acceptance test, delivery and operational need data based on program test schedules.
 - 4. The estimated total cost and hours for design and fabrication.
 - 5. Special requirements needed to support any of the areas relating to GSE design, fabrication, procurement, testing, qualification and logistics.
 - 6. Environmental identification as specified in Paragraph 3.1.9 of the SW-E-0002 specification.

Approval will be granted at the RR for a requirement and not a model or end item. Authorization will be given to initiate conceptual design or a search for existing equipment to fulfill the requirement.

- b. Preliminary Design Review - A PDR shall be conducted to formally review the design approach of the NASA approved GSE end items. The PDR shall be conducted at the 10-30 percent complete design point. At the PDR the following information shall be available:
 - 1. The definition of the compatibility of the GSE with the flight system and/or other GSE.
 - 2. Item Description Sheets for the GSE items with information as defined in Section 6.0 of the SW-E-0002 specification.
 - 3. The design approach, preliminary functional block diagrams, interface requirements, power, envelope, weight, and such other data as considered relevant.
 - 4. Any unusual processes, tools, facilities, or techniques involved in the fabrication or testing of the end item.
 - 5. The definition of interfaces.

Approval shall be given at the PDR for the concept and to proceed with final design.

Preliminary reliability analyses such as FMEAs, parts control requirements and hazard analyses shall be presented at the PDR.

- c. Critical Design Review - A CDR shall be conducted to formally review the design of a selected item or series of end items. The CDR will be conducted at approximately the 90 percent design point to obtain NASA approval on:
 - 1. The completed individual end item specification.
 - 2. The compatibility of the end item or items, as designed, with the SW-E-0002 specification, individual End Item Description Sheet, and the flight system.
 - 3. The end item compatibility with the design interface control documents, schematics, functional block diagrams, and other systems, and subsystems.

Approval at the CDR shall be given on the final design and to authorized procurement or fabrication of the GSE end item.

Results of reliability analyses such as FMEAs parts control requirements and hazard analyses shall be presented at the CDR.

6.1.12 Other Reviews

Configuration related reviews other than the ones defined in Paragraphs 6.1.1 thru 6.1.11 may be required by the Manager, Space Shuttle Program to support specific program requirements/milestones and evaluate total program progress. Though not

formally defined as CM milestones, these reviews will be supported as required by the configuration identification and accounting system. These reviews may be conducted on major program milestones, such as approach and landing, orbital flight, operations planning, etc., to ensure coordination and integration of the flight and supporting hardware/software necessary to accomplish assigned objectives. During these reviews, program concepts, definitions, milestones, problem areas, program direction, etc., will be reviewed and presented to the board for modification if necessary. SSP goals and objectives will be reviewed and updated as required.

6.2 DETAILED HARDWARE CONFIGURATION VERIFICATION

To ensure that the detailed configuration of all program hardware is properly identified and verified, each program element having management responsibility for program hardware shall ensure that a closed-loop accounting and verification system is implemented by their appropriate design activity/contractors (reference NSTS 07700, Volume XI). This closed-loop system shall enable as-built data to be compared with as-designed data with any differences being identified and resolved. These data shall be available at the serialized piece part level for prime contractor supplied items and shall, as a minimum, include traceability to the same level for subcontractor and supplier data.

The verification system must provide the ability to accurately ascertain what the actual product configuration is (or was) at any point in time during fabrication, test, and operations. The product end item configuration should be described in its entirety as it relates to the configuration baseline. The system used to describe the as-designed and the as-built configurations should be an integrated system that includes compatible formats and can provide an accurate comparison. Further, as each manufacturing, planning, fabrication, assembly, test, etc. task is performed, it shall be verified as having been accomplished in accordance with the design requirements. This provides a continuous comparison of the hardware and the as-designed baseline.

The system should be capable of identifying parts and their precise configuration at any level of assembly. This system also should verify that training information, technical publications, training equipment, and spares will be provided in accordance with the approved configuration.

6.3 CONFIGURATION MANAGEMENT AUDITS

The Space Shuttle Management Integration Office shall conduct periodic CM audits of each project office's CM system in accordance with Appendix G.

Each project office shall conduct CM audits of its NASA in-house design activities/contractor's CM system in accordance with project/contract directives which shall satisfy the intent of this document. The Space Shuttle Management Integration Office may participate in the project office's audits as mutually determined necessary.

7.0 MISSION EQUIPMENT

Mission equipment is defined as flight hardware that either extends the capability of the Space Shuttle Vehicle or provides an interface to the cargo. Mission equipment kits are to be provided in three categories: (1) flight element capability extension kits, (2) crew accommodation kits, and (3) cargo interface adapter kits.

SSP controlled drawings are released for each Space Shuttle mission to specify the mission equipment required for that mission. The flight element capability extension kits and the cargo interface adapter kits are specified in the MECSLSI drawing, and the crew accommodation kits are specified in the CCCD. These drawings are specified on the V072-000001 Space Shuttle System Drawing as shown in Figure 3-4.

7.1 FLIGHT ELEMENT CAPABILITY EXTENSION EQUIPMENT KITS

These kits extend the capability of the flight element (Orbiter, SRB, RSRM, ET or SSME) to support a mission. Depending on the mission, limits on electrical power, heat rejection, propellant tankage, etc., may require more capability than the baseline can provide. Therefore, it will be necessary to supply mission kits to satisfy additional mission requirements.

7.2 CREW ACCOMMODATION EQUIPMENT KITS

These kits augment support to the crew by providing additional expendables for missions above the baseline missions or providing additional capability to the crew for specific mission functions.

7.3 CARGO INTERFACE ADAPTER EQUIPMENT KITS

These kits adapt the interface between the baseline Orbiter and its cargo; i.e., payload carriers, payloads or experiments.

7.4 DESIGN/PERFORMANCE REQUIREMENTS DEFINITION

Kit design/performance requirements shall be established by the responsible procuring agency.

7.4.1 Design/Performance Changes

Kit design/performance requirements changes that affect the Shuttle flight elements, including flight software shall be reviewed and dispositioned by the responsible project CCB, in accordance with Paragraph 4.3.3. All changes affecting the SSP baseline, or any program/system element other than the project responsible for a given mission equipment kit shall be forwarded to the Space Shuttle PRCB for approval, in accordance with procedures set forth in Appendix C. Changes which violate the element design control parameter(s) limits for the ISS mission specified in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1, shall be authorized by the PRCB.

7.4.2 End Item Configuration Definition

The design configuration of Shuttle element kits will be verified to be in compliance with NSTS 07700, Volume X, and the established design/performance requirements as a part of the PDR/CDR reviews. The as-built configuration of each kit end item shall be verified by the responsible procuring agency that it conforms to the design configuration as documented on released engineering drawings and specifications. This shall be accomplished at the time of initial kit delivery by an Acceptance Review conducted in accordance with Paragraph 6.1.9. The responsible procuring agency shall ensure the existence of a verification and accounting capability which meets the requirements of Paragraph 6.2.

7.4.3 Mission Equipment Data Packages (MEDPs)

MEDPs shall be prepared in accordance with SL-T-0014, Preparation of Space Transportation System Mission Equipment End Item Data Packages, and delivery requirements shall be as specified in NSTS 07700, Volume V.

7.4.4 As-Built Configuration Accounting

The NASA project office responsible for each kit shall ensure that the as-built configuration of each unit of the kit and any authorized Open Work is properly documented in an Acceptance Data Package prepared in accordance with SN-D-0007.

The as-delivered configuration of each kit and any authorized Open Work or approved post-delivery modifications shall be entered in the Mission Equipment Data Base in accordance with Appendix R.

APPENDIX A

ACRONYMS AND ABBREVIATIONS

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APPENDIX A

ACRONYMS AND ABBREVIATIONS

A&E	Architectural and Engineering
ADM	
ADP	Acceptance Data Package
AFDFP	Ascent Flight Design Freeze Point
AHMS	Advanced Health Management System
AIT	Analysis and Integration Team
AMPTS	Automated Mission and Payload Tracking System
APA	Allowance for Program Adjustment
APM	Associate Program Manager
ASD	Avionic Systems Division
*ASRB	Advanced Solid Rocket Booster
*ASRM	Advanced Solid Rocket Motor
B-RSS	Boeing Reusable Space Systems
BARS	Baseline Accounting and Reporting System
BFS	Backup Flight Software System
C&L	Checkout and Launch
CA	Cost Avoidance
CAAR	Corrective Action Assistance Request
CAR	Change Action Request
CCA	Contract Change Authorization
CCB	Configuration Control Board
CCBD	Configuration Control Board Directive
CCCD	Crew Compartment Configuration Drawing
CCCR	Crew Compartment Configuration Review

* Canceled per NASA Headquarters letter DL (Subject: Advanced Solid Rocket Motor [ASRM] Program Termination), signed October 27, 1993

CCMS	Checkout, Control, and Monitoring Subsystem
CCP	Configuration Control Panel
CDR	Critical Design Review
CE	Change Evaluation
CEI	Contract End Item Configuration End Item
CFE	Contractor Furnished Equipment
CG	Center of Gravity
CI	Configuration Inspection
CIL	Critical Items List
CIP	Carrier Integration Plan
CIR	Cargo Integration Review
CITE	Cargo Integration Test Equipment
CM	Configuration Management
CMO	Configuration Management Office
CO	Change Order
CoFR	Certificate of Flight Readiness
CP	Change Proposal
CPCB	Crew Procedures Control Board
CPDS	Computer Program Development Specification
CPEI	Computer Program End Item
CR	Change Request
CRBD	Change Review Board Directive
CRD	Change Request Directive
CRG	Change Review Group
CRT	Cathode-Ray Tube
D&C	Displays and Controls
DCN	Data Change Notifications Document Change Notice
DCR	Data Change Request Design Certification Review

DDP	Deliverable Data Package Design Development Plan
DEU	Display Electronics Unit
DFI	Development Flight Instrumentation
DIR	Directive
DLSFR	Delta Launch Site Flow Review
DM	Development Motor
DMICB	Daily Mission Integration Control Board
DOD	Department of Defense
DR	Discrepancy Report
DRD	Data Requirements Description
DRR	Design Requirements Review
DSO	Detailed Supplementary Objective
DTO	Detailed Test Objective Development Test Objective
EAC	Estimated-at-Complete
EAPU	Electric Auxiliary Power Unit
ECP	Engineering Change Proposal
ECR	Engineering Change Request
EMU	Extravehicular Mobility Unit
EO	Engineering Order
ERS	Engineering Release System
ET	External Tank
ETR	Eastern Test Range
EVA	Extravehicular Activity
F-MMDB	Flight Master Measurement Data Base
FCE	Flight Crew Equipment
FCE CCB	Flight Crew Equipment Configuration Control Board

FCOD	Flight Crew Operations Directorate
FDF	Flight Data File
FDRD	Flight Definition and Requirements Directive
FEC	Field Engineering Change
FMEA	Failure Modes and Effects Analysis
FOR	Flight Operations Review
FPSR	Flight Planning and Stowage Review
FPSWG	Flight Production Schedules Working Group
FRCB	Flight Rules Change Board
FRD	Flight Requirements Document
FRED	Final Reconfiguration Engineering Drawing
FRF	Flight Readiness Firing
FRR	Flight Readiness Review
FRWG	Flow Review Working Group
FSE	Flight Support Equipment
FSL	Flight Simulation Laboratory Flight Systems Laboratory
FSSR	Functional Subsystem Software Requirements
FSW	Flight Software
FTSOD	Flight Test and Supplemental Objectives Document
G&A	General and Administrative
GFE	Government Furnished Equipment
GN&C	Guidance, Navigation and Control
GPC	General Purpose Computer
GSE	Government Supplied Equipment Ground Support Equipment
GSFC	Goddard Space Flight Center

HEDS	Human Exploration and Development of Space
HSF&E	Human Space Flight and Exploration
HTD	HEDS Technology Demonstration
ICB	Integration Control Board
ICD	Interface Control Document
IDD	Interface Definition Document
IDL	Indentured Drawing List
IDMRD	Intermediate and Depot Maintenance Requirements Document
IES	Industrial Engineering for Safety
IFA	In-flight Anomaly
IMSCCB	Information Management System Configuration Control Board
INC	Installation Notice Card
IP	Integration Plan
IPB	Illustrated Parts Breakdown
IPL	Indentured Parts List Initial Program Load
IPT	Integrated Product Team
IRD	Information Requirements Description
IRN	Interface Revision Notice
ISS	International Space Station
ISSA	International Space Station Alpha
ISSP	International Space Station Program
IUS	Inertial Upper Stage
IVA	Intravehicular Activity
IVBC-3	Integrated Vehicle Baseline Characterization
IWG	Interface Working Group
JIS	Joint Integration Schedule
JMICB	Joint Mission Integration Control Board
JPRCB	Joint Program Requirements Control Board

KSC	Kennedy Space Center
L-2	Launch Minus Two
L&L	Launch and Landing
LCC	Launch Commit Criteria
LCN	Logic Change Notice
LLAFC	Long Life Alkaline Fuel Cell
LM	Lockheed-Martin
LPS	Launch Processing System
LRU	Line Replaceable Unit
LSEAT	Launch Systems Evaluation Advisory Team
LSFR	Launch Site Flow Review
LSS	Launch Support Services
LSRR	Launch Site Requirements Review
MAF	Michoud Assembly Facility
MAST	Measurement and Stimuli
MCC	Mission Control Center
MCR	Master Change Record
MECAS	Mission Equipment Configuration Accounting System
MECSLSI	Mission Equipment Cargo Support Launch Site Installation
MEDP	Mission Equipment Data Packages
*MICB	Mission Integration Control Board
MIO	Management Integration Office
MIP	Mission Integration Plan
MLP	Mobile Launcher Platform
MM	Mass Memory
MMDB	Master Measurement Data Base
MMES	MSFC Mated Element Systems
MML	Master Measurement List

*Replaced by ICB

MMU	Mass Memory Unit
MOA	Memorandum of Agreement
MOD	Mission Operations Directorate
MOU	Memorandum of Understanding
MR	Material Review
MRB	Material Review Board
MRCS	Mission Requirements Control System
MRDB	Measurement/Stimuli Related Data Base
MSFC	Marshall Space Flight Center
MSID	Measurement/Stimulus Identifier
N/A	Not Applicable
O&M	Operation and Maintenance
O&R	Overhaul and Repair
OI	Operational Increment
OMDP	Orbiter Maintenance Down Period
OMI	Operations and Maintenance Instruction
OMP	Operations and Maintenance Plan
OMRS	Operations and Maintenance Requirements Specifications
OMRSD	Operations and Maintenance Requirements and Specifications Document
OPF	Orbiter Processing Facility
OPR	Office of Primary Responsibility
ORB	Orbiter Review Board
OSB	Outside the Board

P/L	Payload
PAR	Problem Action Request
PASS	Primary Avionics Software System
PCASS	Program Compliance Assurance and Status System
PCIN	Program Change Identification Number
PD	Program Directive
PDP	Product Development Plan
PDR	Preliminary Design Review
PDTR	Pre-Delivery Transfer Review
PGSC	Payload and General Support Computer
PIM	Program Integration Manager
PIP	Payload Integration Plan
PIRN	Preliminary Interface Revision Notice
PMP	Project Management Plan
PMRB	Program Material Review Board
POC	Portable Onboard Computer
POCCB	Portable Onboard Computing Control Board
POG	Payload OMRS Working Group
POP	Program Operating Plan
PR	Problem Report
PRACA	Problem Reporting and Corrective Action
PRCB	Program Requirements Control Board
PRCBD	Program Requirements Control Board Directive
PRD	Payload Requirements Document Program Requirements Document
PRM	Performance Reference Mission
PRR	Program Requirements Review
PTRS	Project Technical Requirements Specification

RCN	Requirements Change Notice
RECP	Request for Engineering Change Proposal
RF	Radio Frequency
RID	Review Item Disposition
RMD	Reconfiguration Management Division
RME	Risk Mitigation Experiment
RMS	Remote Manipulator System
RMSCCB	Remote Manipulator System Configuration Control Board
RR	Requirements Review
RSRM	Redesigned Solid Rocket Motor Reusable Solid Rocket Motor
**S&O	Safety and Obsolescence
SA	Supplemental Agreement
SAIL	Shuttle Avionics Integration Laboratory
SAS	Software Approval Sheet
SASCB	Shuttle Avionics Software Control Board
SCA	Shuttle Carrier Aircraft
SCC	Specification Configuration Chart
SCF	Satellite Control Facility
SCL	Specification Change Log
SCN	Software Change Notice
SCR	Software Change Request
SDCB	Shuttle Data Control Board
SECIB	Shuttle Engineering Change Implementation Board
SFOC	Space Flight Operations Contract

** Replaced by SSUPRCB

SIP	Standard Integration Plan System Integration Plan
*SIR	System Integration Review
SM	Systems Management
SODB	Shuttle Operational Data Book
SPAR	Shuttle Project Action Request
SPF	Software Production Facility
SpOC	Space Operations Computing
SR	System Review
SR&QA	Safety, Reliability and Quality Assurance
SRB	Solid Rocket Booster
SRDD	System Requirements and Design Document
SRMS	Shuttle Remote Manipulator System
SRR	System Requirements Review
SSM	Subsystem Manager
SSME	Space Shuttle Main Engine
SSMEC	Space Shuttle Main Engine Controller
SSP	Space Shuttle Program
SSPD	Space Shuttle Program Directive
SSPIA	Space Shuttle Program Interface Agreement
SSU	Space Shuttle Upgrades
SSUPRCB	Space Shuttle Upgrades PRCB
SSV	Space Shuttle Vehicle
SSVE	Space Shuttle Vehicle Engineering
SSVEO	Space Shuttle Vehicle Engineering Office
STA	Shuttle Training Aircraft

* Replaced by ICB

STAR	Space Transportation Automated Reconfiguration
SVS	Space Vision System
S/W	Software
T&O	Test and Operations
TBD	To Be Determined
TCS	Test Control Sequences
TCTI	Time Compliance Technical Instructions
TD	Technical Direction Technical Directive
TDMS	Technical Document Management System
TDRS	Tracking and Data Relay Satellite
TO	Technical Order
TOP	Technical Operating Procedure
TPS	Thermal Protection System
TPS/S	Thermal Protection Subsystem
TRR	Test Readiness Review
TTA	Technical Task Agreement
UMPS	Up Mission Processing Start
USA	United Space Alliance
USAF	United States Air Force
USBI	United Space Booster Inc.
VAB	Vehicle Assembly Building
VAFB	Vandenberg Air Force Base
VECB	Vehicle Engineering Control Board
WAD	Work Authorization Document
WSMC	Western Space and Missile Center

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APPENDIX B

DEFINITIONS

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APPENDIX B

DEFINITIONS

The following terms are used in this document or are commonly used in CM materials. The definitions are provided for the purpose of understanding and uniformity.

Alfred - Is a telecon normally held at 9:00 a.m. (Central) each Wednesday to determine the final PRCB agenda. Each PRCB member or representative statuses their respective scheduled agenda items before the PRCB Chair or designee who determines the final PRCB agenda.

As-Built Configuration - An actual physical configuration of a unit of hardware/software.

As-Delivered Configuration - The as-built configuration that existed at time of delivery.

As-Designed Configuration - A configuration formally approved by the design activity contractor's engineering department.

As-Qualified Configuration - An as-built configuration that was certified to have satisfactorily passed specified qualification tests.

As-Tested Configuration - An as-built configuration that existed at the time of a specified test.

Assembly - Specific arrangement of two or more attached parts.

Baseline Configuration - A specific configuration included in the NASA/design activity/contractor baseline.

Cannibalization - The removal of a serviceable (i.e., flight certifiable) item installed in a SSV element to replace an unserviceable or missing item in a SSV element when spare availability does not meet demand. This definition of cannibalization applies only to those SSV elements delivered to the launch site.

Change Closeout - The process whereby the detailed definition (design) of an engineering change is declared complete and no further engineering data may be released against that specific change.

Change Packaging - The integrating and assembling of the total change documentation (change proposals of all affected parties, IRNs, etc.).

Change Proposal - A CR, IRN, RCN, LCN, CAR, Chit, OMRS exception/waiver, FEC, Software (S/W) CR, and ICB CRD which is submitted to change the SSP baseline.

Change Request - Formal documentation of a proposed change to an existing baseline.

Change Tracking - A function of the configuration accounting task which tracks each change from initial notification of change submittal through CCB disposition, direction to the design activity/contractor, and incorporation.

Configuration Accounting - The task of maintaining, correlating, reporting, and storing configuration documentation for program hardware/software.

Configuration Baseline - The approved and defined configuration which is used as a reference for program planning purposes and as a point of departure for control of changes.

Configuration Baseline Change - A change to an approved configuration baseline.

Configuration Baseline Documentation - The set of documents that records a baselined configuration.

Configuration Change Control - The task of insuring that each engineering change, waiver, or deviation is properly defined, coordinated, and evaluated before being formally dispositioned.

Configuration Control Board (CCB) - The functional body of representatives from selected program organizations, chaired by the CM decision maker, with responsibility to ensure the proper definition, coordination, evaluation, and disposition of all changes to the configuration baseline which the board administers.

Configuration Control Board Directive (CCBD) - The document upon which the decision of the CCB is officially recorded.

Configuration Identification - The task of determining the manner in which each unit of hardware/software is to be described and of placing these descriptions on configuration documentation.

Configuration Management (CM) - The task of integrating and accomplishing in an optimal manner the four subtasks of configuration identification, configuration accounting, configuration change control, and configuration verification.

Configuration Verification - The task of assuring that the program hardware/software is certified as having been designed, built, and tested to the correct configuration baselines.

Design Activity - The organizational activity (NASA or contractor) that is charged with the responsibility to develop and document the design for specific elements of the program.

Design Activity/Contractor Baseline - All of the requirements of the NASA baseline plus additional requirements defined by the design activity/contractor such as those incorporated in detail specifications, process specifications, released drawings, and any other documents released through the design activity/contractor formal engineering release system. Changes to the requirements that do not affect the NASA baseline will be controlled by the design activity/contractor.

Design Freeze - Occurs after completion of element Critical Design Review (CDR). If there is no element CDR, the component, sub-assembly or assembly CDR will be the freeze point.

Design Review - Systematic and formal reviews to verify technical requirements, to establish configuration baselines for further development, and to validate approaches taken to solution of the requirements.

Deviation - A specific authorization, granted before the fact, to depart from a particular baseline requirement for a limited application.

Drawing Number - A number placed on an engineering drawing for identification and accounting purposes.

Drawing Tree - A list, by drawing number, of engineering drawings so arranged that, for any one drawing, the next higher assembly drawing and the set of next lower assembly or part drawings is easily identified.

Effectivity - The specific flight(s), test program(s), hardware/software item(s), and/or time period for which a change is proposed or authorized.

Element Design Control Parameter(s) Limits - Maximum or minimum allowable values to which project management must design in order to satisfy program ascent performance requirements. The delivered value of the parameter being controlled must be either less than, greater than, or equal to the design control value as appropriate to maximize vehicle ascent performance (reference NSTS 07700, Volume X - Book 1, Paragraph 6.1.37).

Engineering Change - A change to approved engineering.

Engineering Change Proposal (ECP) - A proposed engineering change to a configuration baseline prepared by the design activity/contractor in such a manner as to provide for complete assessment of the change.

Engineering Order (EO) - A document prepared by the design activity/contractor to describe a change(s) to released engineering documentation.

Engineering Release System - The single, authoritative control system for assigning document numbers, verifying requirements, recording and transmitting engineering documentation required for fabrication, installation, and test of program hardware/software.

Functional Verification - The task of assuring that hardware/software has been tested as required to ensure that it functions per the design requirements.

Hardware - Items of identifiable equipment including piece parts, components, assemblies, subsystems, and systems.

Incremental Design Review - A technique for accomplishing major program/project design reviews incrementally, as the design for the various program elements/project mature, to permit design activity to proceed in the most efficient manner and to allow initiation of long-lead procurement and/or early manufacturing effort.

Indentured Drawing List (IDL) - A list of drawing numbers and related data arranged or coded such that each drawing's next higher or lower assembly or part drawings can be easily identified.

Indentured Parts List (IPL) - A list of part numbers, arranged in such a way that each unit's subassemblies and assemblies are easily identified.

Installation Notification - The official action and/or document used after contract delivery to update the configuration management system and to inform the cognizant design activity/contractor that a particular modification package has been installed, tested, verified, and accepted in accordance with its associated change instruction.

Integration - The task of assuring that all of the program elements/projects perform in such a manner so that collectively they will accomplish the program/project objectives in the most efficient manner.

Interface - A region common to two or more elements, systems, projects or programs, characterized by mutual physical, functional, and procedural properties.

Interface Control Document (ICD) - Drawings/documentation that record the common design features between two or more interfacing designs.

Interface Revision Notice (IRN) - A standard form used to record changes to an approved ICD.

Modification - A physical change to delivered hardware/software and spares.

Modification Kit - A packaging of all hardware/software/documentation required to perform a modification or correct a noncompliance to delivered equipment.

NASA Baseline - Those requirements and design solutions approved by NASA for inclusion in the SSP and project baseline documentation.

Noncompliance - A condition that exists or will exist when a deliverable item or its related documentation is not in accordance with the NASA baseline at the time of established contractual events.

Nonconformance - A condition of any article or material or service in which one or more characteristics do not conform to requirements. Includes failures, discrepancies, defects, and malfunctions.

Nonstandard Work - Any special maintenance, inspections, and/or tests performed at the launch site not included in the OMRSD.

Part Number - A number applied to a part for identification and accounting purposes.

Product Configuration - The complete, detailed description of program hardware/software.

Program - The consolidation and integration of all efforts required to accomplish a stated objective.

Program Change Identification Number (PCIN) - A single master number issued by the NASA to identify all documentation related to a proposed change.

Program Element - A specific effort which, when combined with all other program elements, contributes to the accomplishment of the program objective.

Program Requirements Baseline - Program requirements established and controlled by the Manager, Space Shuttle Program and the Manager, Launch Integration, KSC.

Program Requirements Control Board (PRCB) - Space Shuttle Program Control Board chaired by the Manager, Space Shuttle Program and the Manager, Launch Integration, KSC that controls the Space Shuttle Program Requirements Baselines.

Progressive Baseline - A configuration baseline that is progressively updated as each change to it is formally defined and approved.

Project - A major element of a program, i.e., all functions required to develop and support such program elements as Redesigned Solid Rocket Motor or Reusable Solid Rocket Motor, Orbiter, main engines, launch and recovery, etc.

Project Requirements Baseline - Those project-level requirements established by a project office as a further definition, and within the scope of the system and program requirements.

Released Documentation - Documentation that has been officially transmitted through the engineering release system and recorded in the engineering release record.

Requirements Traceability - The ability to identify like and related requirements so that traceability of these requirements can be established up and down through the various levels of baseline documentation.

Software - Computer programs required to test, checkout, maintain, or operate program hardware.

SPAR - A Shuttle Project Action Request is used to request and authorize project/SFOC Ground Operations delegated hardware configuration changes and nonstandard work requirements for implementation by the Space Flight Operations Contractor.

Specification - Statement of particulars such as performance, characteristics, requirements, and configuration for a given element of hardware/software.

Subassembly - With respect to some reference assembly, an assembly which is wholly contained within the reference assembly.

System - A composite of all the activities, hardware and software required to accomplish a set of program objectives, i.e., the Space Shuttle System.

System Requirements Baseline - Those requirements established and controlled by the Manager, Launch Integration, KSC, which describe system requirements to be implemented by the Space Shuttle Program elements/project. See Program Requirements Baseline.

Technical Monitoring - Technical monitoring of the interface(s) on behalf of the respective project manager(s) will be performed by technical monitors identified by the project manager(s).

Technical Publication - The overall system/subsystem/equipment requirements, descriptions, and capabilities relative to design goals, performance, reliabilities, maintainability, transportability, and operational characteristics. Includes analyses, studies, evaluations, etc. necessary to maintain the technical descriptions and specifications.

Type I Documentation - Those documents which shall be submitted to and approved by the NASA prior to implementation. Approved Type I documents are considered "baseline". Formal change control procedures will be employed for all Type I documentation.

Unit - A part, subassembly, or assembly.

Waivers - A written authorization to accept designated items which, during production or after having been submitted for inspection, are found to depart from specified requirements, but nevertheless are considered suitable for use "as is" or after rework by an approved method.

APPENDIX C

CONFIGURATION MANAGEMENT PROCEDURES

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APPENDIX C

CONFIGURATION MANAGEMENT CHANGE PROCESSING PROCEDURES

1.0 PURPOSE

The purpose of this appendix is to establish detailed CM change processing procedures for implementation of the SSP requirements. Described change processing herein are the procedures to be used in identifying and establishing baselines and the processing of changes thereto.

2.0 SCOPE

The CM change processing procedures established by this appendix are applicable to all organizations and personnel involved in the submittal and processing of changes to the SSP requirements baselines.

3.0 RESPONSIBILITIES

The Space Shuttle PRCB CM activities that support the procedures as defined in this appendix are the responsibility of the Manager, Space Shuttle Management Integration.

4.0 REVISIONS

Appendix C is not subject to Space Shuttle PRCB change control. Responsibility for control of CM procedure changes is delegated to the PRCB Secretary.

This appendix will be revised as required and changes will be issued as replacement pages or by complete revision of the appendix, as appropriate. All requested changes will be directed to the Space Shuttle PRCB Secretary via a SSP CR and dispositioned by a PRCBD signed by the PRCB Secretary. Changes to the appendix will be indicated by a vertical line in the outside margin of each paragraph changed.

5.0 CONFIGURATION MANAGEMENT RESPONSIBILITIES

The procedures defined herein support SSP procedures defined in NSTS 07700, Volume IV. Project CM procedures will support with the SSP procedures as described herein.

6.0 SSP CHANGE REQUEST PROCESSING

6.1 SPACE SHUTTLE PRCB DISPOSITION

All requests for changes which require a Space Shuttle PRCB disposition will be transmitted to the PRCB Secretary in the form of an SSP CR (see Figure C-1).

NOTE: A limited number of changes may be requested via a CAR (Blue Sheet) form (Figure C-8). These changes are typically corrections or clarifications to previously approved PRCBDs, or changes directed by the Manager, Space Shuttle Program/Manager, Launch Integration, KSC. Initiation of all such changes via a CAR is at the discretion of the Space Shuttle PRCB Secretary.

6.2 SPACE SHUTTLE ICB CR/DIRECTIVE DISPOSITION

All requests for changes which require a Space Shuttle ICB CR/directive disposition will be transmitted to the ICB Chair in the form of a Space Shuttle ICB/CR Directive (see Figure C-2).

6.3 PCIN/SSP CHANGE REQUEST CANCELLATION

All SSP changes are formally tracked in the SSP change tracking and closeout activity from the time the PCIN is assigned until the proposed change is properly withdrawn, cancelled, or dispositioned, and all PRCBD actions closed. When a PCIN has been assigned but a SSP CR has not been submitted, the PCIN may be cancelled by informal written request from the cognizant CM coordinator to the Space Shuttle PRCB Secretary. Either an informal memorandum or a CAR (Figure C-8) may be used. If a SSP CR has been submitted, the CR may be withdrawn by submitting an informal memorandum or a CAR to the PRCB Secretary. The memorandum or CAR shall be signed by the PRCB member who signed the submitted CR or signed by the OPR after obtaining verbal concurrence from the submitting organization. The name and phone number of the concurring individual must be included on the CAR.

6.4 DEVIATIONS AND WAIVERS

6.4.1 Requesting Deviations and Waivers

A deviation from or waiver of an SSP baseline requirement is requested by means of an SSP CR or ICB CR/directive (reference NSTS 07700, Volume IV, Paragraph 4.4.9). The following description is provided for the CR initiator as the standard method of requesting deviations/waivers.

The following information shall be provided:

- a. Requirement: Statement of the applicable requirement to be deviated from or waived. The requirement shall be identified by paragraph, table, or figure number, as applicable, and by title. If the requirement is lengthy, only the applicable portion need be stated on the CR. If the CR does not identify the specific portion of the requirement that applies, the requirement shall be stated in its entirety in the Space Shuttle directive that authorizes the deviation/waiver.

- b. Deviation/Waiver: Statement of the condition(s) and/or specific item(s) to be exempted from the applicable requirement(s). The involved hardware/software/facility shall be specifically identified and, if applicable, subordinate components or units shall be identified by name, part number, and serial number.
- c. Rationale: Concise statement of the justification for the deviation/waiver.
- d. Effectivity: Identification of the specific mission(s), hardware/software/facility and/or period(s) for which the deviation/waiver is to be in effect.
- e. Authority: Identification of the Space Shuttle directive that authorizes the implementation and documentation of the deviation/waiver, by directive number and date of signature.

6.4.2 Incorporating Deviations and Waivers

The deviation/waiver is incorporated in the appropriate NSTS 07700, volume or subordinate SSP baseline document in accordance with the following:

- a. If the requirement is stated in the NSTS 07700 volume, the deviation/waiver is incorporated in the appropriate NSTS 07700 volume.
- b. If an NSTS 07700 volume references a requirement stated in a subordinate SSP baseline document maintained by the Space Shuttle Program Management Integration Office, the deviation/waiver is incorporated in the appropriate subordinate document.
- c. If an NSTS 07700 volume references a requirement stated in a subordinate SSP baseline document maintained by an SSP organization other than the Management Integration Office, or a document that is not controlled by the program (e.g., NASA Handbook, Military Specification, JSCM 8080 Standard, etc.), the deviation/waiver is incorporated in the NSTS 07700 volume that references the document (see Paragraph 4.4.9, Note 2). If the requirement is referenced by more than one NSTS volume, the appropriate volume is determined. Exceptions to this requirement are documents for which responsibility for incorporation of deviations/waivers has been delegated by the Manager, Space Shuttle Program, to an organization other than the Management Integration Office. Such delegation has been authorized for the following documents.

<u>Number</u>	<u>Title</u>	<u>Authority</u>	<u>Responsible Office</u>
NSTS 08171	Operations and Maintenance Requirements and Specifications Document (OMRSD)	PRCB	MK-SIO
NSTS 08399	Space Shuttle Program (SSP) Critical Items List (CIL)	PRCB	JSC-MO
	SSP ICDs (reference Appendix F)	PRCB	JSC-MS

NOTES: 1. The procedures for incorporation of deviations/waivers in the above listed documents are contained within these documents.

2. FMEA/CIL waivers are no longer documented in NSTS 07700, Volume X - Book 5 (retired by PRCBD S004600G).

6.5 PROJECT CCB

Changes which have been considered by a project CCB, but must be referred to the Space Shuttle PRCB because they affect SSP requirements, shall be submitted to the PRCB Secretary. A SSP CR and a copy of the complete change package shall be submitted to the PRCB Secretary.

6.6 PRCB CHANGE FLOW

All SSP changes will be processed in accordance with the guidance provided by the SSP CRG.

6.6.1 Space Shuttle PRCB Scheduling

Space Shuttle PRCB scheduling shall be in accordance with the following:

a. Normal Scheduling

- Daily - After receipt by Space Shuttle PRCB Secretary, CR processed through the SSP CRG and made available to the community.
- 9-14 Work Days - After CR Disposition, CEs are due to the PRCB Secretary.
- 15-20 Work Days - After CR Disposition, Space Shuttle PRCB is conducted.

b. Expedite Scheduling

A CR which requires expedited scheduling to a PRCB will be forwarded to the PRCB Secretary for processing through the daily CRG meeting. Upon receipt,

the PRCB Secretary will evaluate the CR for expediting and schedule the CR to the PRCB recommended by the initiator if expedited scheduling is warranted. After CR disposition, CEs should be transmitted to the PRCB Secretary by the date specified on the CR.

c. **Scheduling for Changes Requiring Immediate Attention**

SSP changes requiring immediate attention to preclude an adverse programmatic impact will be processed as specified in Appendix K.

The above schedules (Paragraphs 6.6.1a and 6.6.1b) will not be deviated from except in the following instance. CRs which do not meet the requirements specified in NSTS 07700, Volume IV, will be either rejected or held no more than one day to allow the submitting organization to obtain resolution of the deficiency.

6.6.2 Change Review Group

The SSP CRG is responsible for performing the following functions:

- a. Review all SSP CRs to ensure that they are sufficiently clear, technically complete, and ready for evaluation.
- b. Assign the OPR.
- c. Establish the date for review and decision by the Space Shuttle PRCB.
- d. Select those offices from which evaluations are requested and specify the date that evaluations are due to be submitted to the Space Shuttle PRCB Secretary.
- e. Determine which CRs are of such a nature that they can be processed as "record" changes or otherwise worked to completion outside of the formal Space Shuttle PRCB.
- f. Delay by no more than one day the processing of CRs which do not identify cost, schedule, weight or other pertinent information when it is processed pending clarification by the submitter.
- g. Reject CR if proposed change or supporting information is unclear or incomplete.
- h. Verify that N/A-to-acceptance, prior-to-acceptance, or post-acceptance is checked and that cost/weight threshold data is included in the CR for prior-to-acceptance hardware/software changes.

6.6.2.1 Membership

The SSP CRG is chaired by the Manager, Space Shuttle Management Integration and is composed of representatives of the Management Integration Office and United Space Alliance, as required to support discussions or CRs submitted.

6.6.2.2 Meetings

Meetings are held daily if required. CRs which require immediate action will be reviewed and dispositioned immediately by the CRG Chair to determine the OPR, the Space Shuttle PRCB date, requested evaluation requirements, and special recommendations or considerations. CRs handled in this manner will be reported to the next CRG meeting.

6.6.2.3 Office of Primary Responsibility

For changes that affect more than one element, an OPR will be designated within the SSP organization, i.e., Safety, Reliability, and Quality Assurance, Space Shuttle Management Integration, Space Shuttle Business Office, Space Shuttle Systems Integration, Space Shuttle KSC Integration, and Space Shuttle Customer and Flight Integration. The PRCB members represent SSP offices which may be selected as OPRs. SSP elements/projects may be designated as OPR for changes that affect only that element and have no effect on the functional or physical interface with another element, i.e., Orbiter, SRB, RSRM, SSME, ET, L&L, Flight Crew Operations, Mission Operations, and Engineering. The OPR is responsible for the following:

- a. Take action required by the CRG to obtain assistance from the initiator of a CR to make changes or modifications necessary to resolve deficiencies.
- b. Assign the appropriate individuals to present the change to the Space Shuttle PRCB.
- c. Work with presenter(s) and review presentation to assure brevity, completeness, and readiness for decision by the Space Shuttle PRCB Chair.
- d. Conduct coordination as required with the originator, PRCBD writer, change evaluators, and other affected organizations prior to presentation to ensure all alternatives are considered. Prepare presentation summary charts. (See Figure C-5, reference Paragraph 8.1.)
- e. Provide presentation material to the PRCB Secretary as directed by transmittal letter for each Space Shuttle PRCB agenda.
- f. Ensure that the presentation to the Space Shuttle PRCB includes cost/schedule/weight impact estimates. Recommend change disposition to the Space Shuttle PRCB.
- g. If a change is not ready for presentation to the Space Shuttle PRCB on the assigned date, or if a change is scheduled for review by the PRCB and is later recommended by the OPR for processing outside the board, the OPR shall prepare a CAR per Figure C-8 instructions and submit the CAR to the Space Shuttle PRCB Secretary for approval. The PRCB Secretary may request the OPR to present the status of such changes to the Space Shuttle PRCB.

6.6.3 SSP Change Request Originator Responsibilities

The SSP CR originator will ensure that all applicable portions of the CR are completed. Positive statements shall be made that the change will or will not impact program cost, weight, schedules, etc.

6.6.4 Distribution

Copies of each SSP CR, with back-up information, as furnished to the Space Shuttle PRCB Secretary, will be made available by the PRCB Secretary to all Space Shuttle PRCB members for evaluation. Requested evaluations and evaluation due dates will be noted on the CR OPR/evaluations requested form. CR originators (PRCB members) shall not normally submit evaluations unless the CRG worksheet indicates a requested evaluation is required. Evaluations are prepared on the CE Sheet (Figure C-4).

Evaluations may be returned through the NASA mail system or through electronic systems capable of transmitting a computer generated reproduction of the evaluation sheet and that is available to both the evaluating organization and the Space Shuttle PRCB Secretary. Urgent and emergency changes will be expedited as required in order to satisfy program schedule requirements.

6.6.5 Change Records

The Space Shuttle PRCB Secretary shall maintain a change log and an individual master file on each SSP CR. Upon issuance of a PCIN by the PRCB Secretary, a change file will be initiated and maintained throughout the life of the program. These files will be available to SSP personnel for reference. Each file will contain copies of the following (where applicable):

- a. SSP CR, including backup information
- b. Request for Engineering Change Proposal (RECP)/Engineering Change Request (ECR)
- c. ECP/SCN with cover letter
- d. RID
- e. CE Forms
- f. PRCBD
- g. CARs (Blue Sheets)

- h. Any other correspondence relating to the change
- i. Space Shuttle PRCB meeting mini minutes
- j. ICD/IRN
- k. Implementation direction, Technical Direction (TD), Change Order (CO), CCA, etc.
- l. Action Closeout Requests (Pink Sheets) and associated data

6.7 ICB PROCESS CHANGE FLOW

CPs may be submitted to the ICB either on the SSP CR/DIR or on the ICB CR/DIR. This section details the procedures to be followed when the ICB CR/DIR is used.

6.7.1 ICB Scheduling

CR/DIRs will be scheduled to the ICB board on the board date requested by the submitter. The CR/DIR may also be approved OSB with the agreement of the approving official. The OSB approval may take place at any time after the CR/DIR has been submitted. CR/DIRs which have been scheduled to an ICB may be rescheduled to another board date at the discretion of the initiator by contacting SSP CM.

6.7.2 ICB CR/DIR Submittal

All requests for baselining or changing payload integration documents under ICB authority will be transmitted to SSP CM on an ICB CR/DIR, SSP Form 4040, Figure C-2.

6.7.2.1 OPR Responsibilities

The OPR is the office or person that is responsible for the technical content of a document or CR/DIR. NSTS 07700, Volume IV - Book 1, Appendix F, establishes the OPR for each document.

6.7.3 CR/DIR Evaluation

All CR/DIRs will be evaluated by appropriate offices based on review of CR/DIR content. SSP CM will make available daily a copy of the CR/DIR, with all attachments to evaluators for evaluation. Evaluators will include all ICB board members and any other individuals or offices that the initiator may designate. Included with the CR/DIR will be the date the item is scheduled to go to the board, the evaluation due date and where to return the evaluation.

6.7.4 Assignment of Document Numbers, and CR/DIR Numbers

SSP CM maintains the documentation number system. Numbers can be obtained by contacting SSP CM. The Space Shuttle documentation numbers are assigned in sequence.

The following CR/DIR numbering scheme has been designed for the Space Shuttle payload documentation system. CR/DIRs have multi-part numbers. These numbers are made up of the basic document number, XXXXX, the increment number YYY and other unique identifiers as described below. The CR/DIR to baseline document number NSTS 14019, for example, is assigned P14019-001. Once the document has been baselined, the first CR/DIR is P14019-002, with succeeding changes to the document designated P14019-003, -004, etc., as described below. When a CR/DIR is revised, the same CR/DIR number is used but the first revision is indicated by the letter A after the CR/DIR number; the second revision, B, etc. Only SSP CM may assign CR/DIR numbers for documents (other than Flight Production Schedules Working Group [FPSWG] numbers, which are assigned by the Manifest and Flight Integration Office).

<u>Document</u>	<u>CR/DIR Number (example)</u>
a. Payload-unique PIP (where P indicates PIP and XXXXX represents the PIP number).	PXXXXX-YYY
b. Payload-unique PIP annex (single part) where A indicates annex and NN the annex number.	AXXXXX-ANN-YYY
c. Payload-unique PIP annex with more than one part where PT are designated letters that indicate part, and Z is the actual part number (e.g., 1, 2, 3).	AXXXXX-ANN-PTZ-YYY
d. Annex with multiple parts and appendixes where P is a designated letter that indicates part, Z is the actual part number, and Q is the volume letter (e.g., A, B, C, D).	AXXXXX-ANN-PZQ-YYY
e. Annex divided into volumes, where VL are designated letters that indicate volume and Q is the volume letter.	AXXXXX-ANN-VLQ-YYY
f. OMRSD (Payload unique)	AXXXXX-A09-PT2-YYY

g. ICD (where A is a designated letter and XXXX is a sequential number within the ICD system).	AXXXX	
h. Blank book CR/DIR (where B21000 indicates blank book and RRR-RRR are fields for unique acronyms determined by the nature of the document).	B21000-RRR-RRR-YYY	
i. Blank book annex.	B21000-ANN-YYY	
j. Flight Production Template Schedules.	FPSXXXXX	
k. Flight Tests and Supplementary Objectives Document (where FTS16725 is the FTSOD document designator).	FTS16725-YYY	
l. FRD (where FRD17462 is the FRD document designation and FF is the flight number).	FRD17462-FF-YYY	
m. General changes (which cannot be tied directly to a payload or flight document).	GYYYYY	
n. NSTS 07700, Volume XIV.	D07700-014-YYY	
o. NSTS 07700, Volume XIV appendixes (where LLL is the Arabic appendix numeral).	DO7700-014-LLL-YYY	
p. Program Change Identification Number (PCIN), for PRCB items, where S is a designated letter.	SYYYYY	
q. Miscellaneous documents under ICB control (where R is a designated letter).	RXXXXX-YYY	
r. Cargo element PIP (same as a. - payload-unique PIP).	PXXXXX-YYY	
s. Cargo element ICD changes would be same as g. (where A is a designated letter and XXX is a sequential number within the ICD system).	AXXXX	

6.7.5 Flight Manager Authority

Flight-specific CRs will be dispositioned by the assigned flight manager in accordance with CM procedures in this appendix and Appendix F. Editorial and no impact CRs may be dispositioned outside of the IPT forum by the flight manager. Those CRs with issues will be presented and dispositioned at the IPT meeting.

6.7.6 Closing a CR/DIR

Once a CR/DIR is dispositioned by the appropriate parties, the original CR/DIR is returned to SSP CM. Receipt of the original paperwork is a requirement for closure of the CR/DIR in the SSP CM files. CR/DIRs requiring joint SSP/customer approval cannot be closed until both parties approve or one party disapproves, or the initiator withdraws the CR/DIR. CR/DIRs that have “approved with change” disposition by one party (SSP or customer) must also have “approved with change” disposition by the other party (SSP or customer).

7.0 SPACE SHUTTLE PRCB AGENDA

The Space Shuttle PRCB Secretary shall prepare an agenda of changes scheduled to be presented to the Space Shuttle PRCB. Preliminary and Revision 1 PRCB agendas will be electronically published by the PRCB Secretary approximately 13 days and 2 days, respectively, prior to the formal meeting of the regular PRCB. The final agenda is electronically published after the “Alfred” which is one day before the PRCB meeting. Agendas for special Space Shuttle PRCB meetings will be electronically published according to the same schedule unless the time until the meeting is less than 13 days.

7.1 (DELETED)

(NOTE: Pre-PRCB has been deleted.)

8.0 PRESENTATIONS

Presentation material shall be included with the CR as part of the background.

The responsible presenter will prepare change presentations for the Space Shuttle PRCB meeting in general conformance with the following instructions.

8.1 SUMMARY CHART

A summary chart will be prepared for each CR in accordance with Figure C-5. In those cases where the change presenter is a contractor, the OPR is responsible for development and presentation of the summary chart.

8.2 EFFECTS ON PROGRAM DOCUMENTATION

Include proposed revised wording for affected program documentation. If recommended wording changes are the same as in the CR, use a copy of the CR. If they differ from the CR provide the new wording annotated to note differences from the CR.

8.3 RATIONALE FOR DECISION

This is a comprehensive summary of pertinent information, i.e., performance curves, schematics, drawings, etc., build-up of the technical data and trade-offs presented in the preceding charts.

8.4 COST ASSESSMENT ANALYSIS

It is the OPRs responsibility to ensure that a cost assessment be performed and presented by the best available source who should use the following guidelines in preparation of the appropriate change cost analysis.

- a. Scope the work to be done on hardware/software by task.
- b. Break-out costs in terms of schedule, manpower, materials, subcontracts, burden, General and Administrative (G&A), and fee.
- c. Identify the cost by Space Shuttle Upgrades (SSU), APA (production), and APA (operations) by fiscal years and by affected projects.
- d. Identify all methods used for preparing cost estimates.
- e. Identify the data upon which estimates are based.
- f. Identify personnel responsible for the estimates, with phone numbers.

NOTE: It is impossible to make all presentations uniform but each presentation should be addressed; "Has it satisfied the above criteria?"

9.0 RECORD OF MEETINGS

The Space Shuttle PRCB Secretary will document all actions of the PRCB meetings and record the proceedings of all PRCB meetings on voice tape. The voice tapes will be maintained for two years by the PRCB Secretary.

10.0 PROGRAM REQUIREMENTS CONTROL BOARD DIRECTIVES

For each change dispositioned by the Space Shuttle PRCB Chair, the PRCB Secretary will prepare a PRCBD to document the final disposition taken. The PRCBD will be in

accordance with Figure C-6 and will be signed by the Space Shuttle PRCB Chair or designee, as authorized elsewhere in NSTS 07700, Volume IV - Book 1. PRCBDs will be identified with the same number as that of the SSP CR being dispositioned. An additional suffix R1, R2, R3, etc., may be used to identify revisions. Each revised PRCBD shall contain all unchanged direction as well as the revised wording. The revised wording for each revision shall be identified in the margin with a symbol that distinguishes the changes incorporated by each revision.

11.0 ACTION ITEMS

11.1 SPACE SHUTTLE PRCB DIRECTIVE ACTION ITEMS

Action items assigned during a Space Shuttle PRCB meeting will be recorded on PRCBDs. PRCBD actions are direction from the Space Shuttle PRCB Chair to the program element/project/implementation organization to which the action is assigned. Therefore, it shall be the responsibility of the program element/project/implementation organization to which a PRCBD action is assigned to assure that the action is properly closed by the assigned due date. Action items are closed by the actionee organization providing the PRCB Secretary the proper closeout documentation to verify that the directed action has been implemented (see Figure C-7). PRCBD action items will be electronically recorded and tracked in the PRCBD action item files in the BARS data base.

11.2 CLOSEOUT DOCUMENTATION

PRCBD Action Closeout Requests (Pink Sheets), shown in Figure C-9, are to be submitted by the actionee organization when providing action closeout rationale for PRCBD action items. The PRCBD Action Closeout Request provides action closeout information and may be used independently or attached to supplementary closeout data. Proper closeout documents which clearly indicate that direction has been issued to implement the Space Shuttle PRCB direction are: CCBDS, CCAs, COs, Supplemental Agreements (SAs), TDs, or directive type memorandums or letters, etc. The appropriate PCIN shall be depicted on the implementation documentation, e.g., CCA, CO, CCBDS, TD, etc.

When these documents are submitted as evidence of closure, the PRCB Secretary will assure that the submitted documentation satisfies closure of the assigned action. In the event that the submitted documentation does not satisfy closure, the Space Shuttle PRCB Secretary will coordinate with the OPR and/or actionee to resolve the open issue.

11.3 DELEGATED CLOSURE AUTHORITY

Action item closeout approval is the responsibility of the Space Shuttle PRCB Secretary except in those cases in which closeout authority has been specifically delegated as described below.

MSFC/KSC - The Lead, Shuttle Configuration Management Office (MSFC), and the Manager, Launch and Landing Projects Office (KSC) have been delegated the authority to close the following types of actions:

- a. ICD/IRN implementation
- b. Implementation of program documentation changes
- c. Implementation of modification to flight or ground hardware
- d. Implementation of nonstandard work
- e. Others when it is clear that the project has fully implemented the PRCBD actions as documented in proper closeout documentation

Boeing Reusable Space Systems - The Director, Configuration Management/Integration Quality Assurance has been delegated the authority to close action items to release IRNs.

In all cases of delegated closure authority, the closure will be accomplished via direct electronic input into the BARS action item tracking file. Substantiating closeout documentation for each action closed will be placed in the permanent files at each location which is delegated action closure authority.

11.4 REPORTS

Open action item reports that list all open PRCBD actions, by actionee organization, will be provided to the actionee organizations on a periodic basis as established by the Space Shuttle PRCB Secretary. Special reports will be provided that are sorted by mission and list the open PRCBD action items that must be closed prior to that mission. These special reports will be provided as frequently as is required to ensure all actions that are required to be closed prior to a mission are in fact closed. Other special reports are available through the BARS and may be obtained by request from the PRCB Secretary.

When open action reports are provided to the actionee, each actionee will assure that the report agrees with his records with respect to documentation submitted for closure of the open actions. In the event the actionee determines the report does not agree with his records, the actionee will coordinate with the Space Shuttle PRCB Secretary to resolve the open issue.

12.0 CONFIGURATION STATUS AND ACCOUNTING

This section describes the requirements and procedures for the CM status and accounting system, which will provide for monitoring changes processed through the Space Shuttle PRCB change system.

12.1 OBJECTIVES

The objective of this system is to provide SSP management with visibility into the planned and actual status of each change being processed and the actions required. The system will be capable of identifying actions required, delinquencies, change trends, etc., and verify project implementation PRCB direction as applicable.

12.2 DATA ELEMENTS (As Applicable)

- a. PCIN number
- b. PCIN assigned date
- c. SSP CR number
- d. Change title
- e. Change originator
- f. Evaluations received
- g. PRCBD number
- h. PRCBD date
- i. PRCB schedule date
- j. PRCB actual date
- k. Contract direction (CCA/TD/contract CO/etc.)
- l. Date of contract direction
- m. Effectivity
- n. Remarks
- o. SSP documentation effect
- p. Associated project ECP(s)
- q. Affected program element

- r. PRCBD action items
- s. PRCBD action OPR
- t. PRCBD actionee
- u. PRCBD action items suspense date
- v. PRCBD action item closeout

12.3 CHANGE TRACKING AND CLOSEOUT

12.3.1 Purpose and Scope

The change tracking and closeout activity provides the mechanism for recording the assignment of PCIN to proposed SSP changes and recording and tracking the status of the changes. Each proposed SSP change is tracked from the time the PCIN is assigned until the last action required for that change is closed. Blocks of PCINs are assigned to the projects to identify changes processed within their activities and for changes submitted to the SSP for disposition. Once a change has been submitted to the SSP, it will be tracked in the SSP change tracking system until all required actions are closed. Projects shall establish and operate a change tracking system that records and tracks the status of changes processed within their activity until all actions required for each change are closed, and accounts for each PCIN assigned from their block of PCINs.

12.3.2 General

PCINs are assigned for packaging a total change, including related data, into one common tracking number. The initial assignment of a PCIN is entered into the BARS. Each change in status, as the change progresses through the system to the Space Shuttle PRCB for disposition and subsequent implementation of the Space Shuttle PRCB direction, is updated in the BARS to provide a complete record of the change processing, disposition and implementation (reference Figure C-7). Various reports are available from the BARS to provide management visibility of the status of the change processing activity. Hardcopy files of each change are also maintained by the Space Shuttle Management Integration Office. Each change is tracked until the last action required for that change is closed.

The same PCIN assigned to the original change will be used for all revisions to a change package. The revisions will be tracked in the same manner as the original change until all required actions are closed.

Change processing status reports and PRCBD open action item status reports are available from the BARS and are provided to the SSP element/project organizations

and to SSP management as required. Paragraph 11.1 provides a more detailed description of the Space Shuttle PRCBD action item tracking and closeout activity.

The following delineate the actions and responsibilities for maintenance of the PCIN data file.

<u>Responsibility</u>	<u>Actions</u>
A. Change Initiator	<ol style="list-style-type: none"> 1. Requests PCIN number assignment from SSP at JSC when change need is identified. <p>NOTE: The requester shall furnish the following information when requesting a PCIN:</p> <ol style="list-style-type: none"> a. Title of change b. Initiator's organization and name c. Affected projects d. Other data if known (RECP No., MCR No., etc.)
B. Space Shuttle Management Integration Office	<ol style="list-style-type: none"> 1. Assigns PCIN to authorized requester and obtains pertinent data related to change. 2. Logs assignment and inputs data into the PCIN data file. 3. Inputs data into the PCIN data file to record the status of the change as it progresses through the change processing system. 4. Inputs PRCBD action items assigned into the PRCBD action item tracking files. 5. Tracks PRCBD actions to assure all actions are properly closed.

13.0 SSP CONFIGURATION VERIFICATION

13.1 SSP BASELINE DOCUMENTATION CHANGE PAGE VERIFICATION

The Space Shuttle PRCB Secretary will verify that all change pages to baselined SSP documents, as directed by the Space Shuttle PRCBDs, are accurate and are within the scope of the direction.

13.2 AS-DESIGNED/AS-BUILT HARDWARE VERIFICATION

The Space Shuttle PRCB Secretary shall monitor and support each SSP element/project, as required, at CI to verify the as-designed/as-built configuration of each end item.

13.3 SSP PROJECT CONFIGURATION MANAGEMENT AUDIT REVIEWS

The SSP element and project offices' Configuration Management Office (CMO) organizations shall conduct CM audits/reviews as necessary to assure that the project and contractor change processing activities comply with the requirements and procedures specified in this appendix and in other sections of NSTS 07700, Volume IV - Book 1.

FIGURE C-1

SPACE SHUTTLE PROGRAM CHANGE REQUEST

PCIN <div style="text-align: center;">①</div>	SPACE SHUTTLE PROGRAM CHANGE REQUEST	PAGE <u> 1 </u> OF <div style="text-align: center;">③</div>
CR NO. <div style="text-align: center;">②</div>		Acceptance: N/A Prior-to _____ Post <div style="text-align: center;">④</div>
INITIATED BY: <div style="text-align: center;">⑤</div> OFFICE: _____ PHONE #: _____		
CHANGE TITLE: <div style="text-align: center;">⑥</div>		
CHANGE PROPOSALS/REQUESTS IDENT. NO. <div style="text-align: center;">⑦</div>	SSP DOCUMENTS AFFECTED <div style="text-align: center;">⑧</div>	
DESCRIPTION OF CHANGE: <div style="text-align: center;">⑨</div>		
REASON FOR CHANGE: <div style="text-align: center;">⑩</div>		
SSP-MG/MANAGEMENT INTEGRATION USE ONLY		
<div style="display: flex; justify-content: space-between;"> <div>OUTSIDE BOARD: _____</div> <div>EVALUATION DUE: <div style="text-align: center;">⑪</div> _____</div> <div>BOARD DATE: _____</div> </div>		

SSP Form 4000A (Rev Oct 95)

FIGURE C-1

SPACE SHUTTLE PROGRAM CHANGE REQUEST

PCIN CR NO.	SPACE SHUTTLE PROGRAM CHANGE REQUEST	PAGE OF										
SYSTEM ELEMENT(S) AFFECTED: <table style="width:100%; border: none;"> <tr> <td style="width:33%; vertical-align: top;"> <input type="checkbox"/> System Integration <input type="checkbox"/> Orbiter/GFE <input type="checkbox"/> EVA/Crew Equipment <input type="checkbox"/> Space Shuttle Main Engine <input type="checkbox"/> External Tank <input type="checkbox"/> Solid Rocket Booster </td> <td style="width:33%; vertical-align: top;"> <input type="checkbox"/> Reusable Solid Rocket Motor <input type="checkbox"/> KSC Projects <input type="checkbox"/> System Software <input type="checkbox"/> Flight Support Equipment <input type="checkbox"/> Shuttle Carrier Aircraft <input type="checkbox"/> IUS </td> <td style="width:33%; vertical-align: top;"> <input type="checkbox"/> Integrated Avionics <input type="checkbox"/> Payloads <input type="checkbox"/> Operations <input type="checkbox"/> Spacelab <input type="checkbox"/> Other (<i>Specify</i>) </td> </tr> </table>			<input type="checkbox"/> System Integration <input type="checkbox"/> Orbiter/GFE <input type="checkbox"/> EVA/Crew Equipment <input type="checkbox"/> Space Shuttle Main Engine <input type="checkbox"/> External Tank <input type="checkbox"/> Solid Rocket Booster	<input type="checkbox"/> Reusable Solid Rocket Motor <input type="checkbox"/> KSC Projects <input type="checkbox"/> System Software <input type="checkbox"/> Flight Support Equipment <input type="checkbox"/> Shuttle Carrier Aircraft <input type="checkbox"/> IUS	<input type="checkbox"/> Integrated Avionics <input type="checkbox"/> Payloads <input type="checkbox"/> Operations <input type="checkbox"/> Spacelab <input type="checkbox"/> Other (<i>Specify</i>)							
<input type="checkbox"/> System Integration <input type="checkbox"/> Orbiter/GFE <input type="checkbox"/> EVA/Crew Equipment <input type="checkbox"/> Space Shuttle Main Engine <input type="checkbox"/> External Tank <input type="checkbox"/> Solid Rocket Booster	<input type="checkbox"/> Reusable Solid Rocket Motor <input type="checkbox"/> KSC Projects <input type="checkbox"/> System Software <input type="checkbox"/> Flight Support Equipment <input type="checkbox"/> Shuttle Carrier Aircraft <input type="checkbox"/> IUS	<input type="checkbox"/> Integrated Avionics <input type="checkbox"/> Payloads <input type="checkbox"/> Operations <input type="checkbox"/> Spacelab <input type="checkbox"/> Other (<i>Specify</i>)										
CHANGE IMPACT: <table style="width:100%; border: none;"> <tr> <td style="width:33%; vertical-align: top;"> <input type="checkbox"/> Safety <input type="checkbox"/> Performance <input type="checkbox"/> Reliability <input type="checkbox"/> Maintainability <input type="checkbox"/> Spares <input type="checkbox"/> GSE <input type="checkbox"/> GFE <input type="checkbox"/> Security <input type="checkbox"/> Mod/Mission Kit </td> <td style="width:33%; vertical-align: top;"> <input type="checkbox"/> Flight Manifest <input type="checkbox"/> Payloads <input type="checkbox"/> Certification/Recertification <input type="checkbox"/> Required-Method- <input type="checkbox"/> Test <input type="checkbox"/> Analysis <input type="checkbox"/> Similarity <input type="checkbox"/> Flight Operations <input type="checkbox"/> Ground Operations </td> <td style="width:33%; vertical-align: top;"> <input type="checkbox"/> Simulators & Trainers <input type="checkbox"/> Software <input type="checkbox"/> OMRS <input type="checkbox"/> MMDB <input type="checkbox"/> Turnaround <input type="checkbox"/> Facilities <input type="checkbox"/> SAIL <input type="checkbox"/> Other (<i>Specify</i>) </td> </tr> </table>		<input type="checkbox"/> Safety <input type="checkbox"/> Performance <input type="checkbox"/> Reliability <input type="checkbox"/> Maintainability <input type="checkbox"/> Spares <input type="checkbox"/> GSE <input type="checkbox"/> GFE <input type="checkbox"/> Security <input type="checkbox"/> Mod/Mission Kit	<input type="checkbox"/> Flight Manifest <input type="checkbox"/> Payloads <input type="checkbox"/> Certification/Recertification <input type="checkbox"/> Required-Method- <input type="checkbox"/> Test <input type="checkbox"/> Analysis <input type="checkbox"/> Similarity <input type="checkbox"/> Flight Operations <input type="checkbox"/> Ground Operations	<input type="checkbox"/> Simulators & Trainers <input type="checkbox"/> Software <input type="checkbox"/> OMRS <input type="checkbox"/> MMDB <input type="checkbox"/> Turnaround <input type="checkbox"/> Facilities <input type="checkbox"/> SAIL <input type="checkbox"/> Other (<i>Specify</i>)	EFFECTIVITY: <div style="text-align: center; border: 1px solid black; border-radius: 50%; width: 40px; margin: 0 auto;">14</div>							
<input type="checkbox"/> Safety <input type="checkbox"/> Performance <input type="checkbox"/> Reliability <input type="checkbox"/> Maintainability <input type="checkbox"/> Spares <input type="checkbox"/> GSE <input type="checkbox"/> GFE <input type="checkbox"/> Security <input type="checkbox"/> Mod/Mission Kit	<input type="checkbox"/> Flight Manifest <input type="checkbox"/> Payloads <input type="checkbox"/> Certification/Recertification <input type="checkbox"/> Required-Method- <input type="checkbox"/> Test <input type="checkbox"/> Analysis <input type="checkbox"/> Similarity <input type="checkbox"/> Flight Operations <input type="checkbox"/> Ground Operations	<input type="checkbox"/> Simulators & Trainers <input type="checkbox"/> Software <input type="checkbox"/> OMRS <input type="checkbox"/> MMDB <input type="checkbox"/> Turnaround <input type="checkbox"/> Facilities <input type="checkbox"/> SAIL <input type="checkbox"/> Other (<i>Specify</i>)										
SAFETY AND MISSION ASSURANCE: <table style="width:100%; border: none;"> <tr> <td style="width:50%; vertical-align: top;"> <div style="display: flex; justify-content: space-between;"> <div> CRITICALITY YES NO </div> <div> <input type="checkbox"/> No flight or industrial safety impact <input type="checkbox"/> Flight & industrial safety impacts have been identified & incorporated </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> 1, 1R, 1S 2, 2R </div> <div> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">15</div> </div> </div> </td> <td style="width:50%; vertical-align: top;"> SCHEDULE IMPACT: <div style="text-align: center; border: 1px solid black; border-radius: 50%; width: 40px; margin: 0 auto;">18</div> </td> </tr> </table>		<div style="display: flex; justify-content: space-between;"> <div> CRITICALITY YES NO </div> <div> <input type="checkbox"/> No flight or industrial safety impact <input type="checkbox"/> Flight & industrial safety impacts have been identified & incorporated </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> 1, 1R, 1S 2, 2R </div> <div> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">15</div> </div> </div>	SCHEDULE IMPACT: <div style="text-align: center; border: 1px solid black; border-radius: 50%; width: 40px; margin: 0 auto;">18</div>	MILESTONE: <table style="width:100%; border: none;"> <tr> <td><input type="checkbox"/> Delta LSFR</td> </tr> <tr> <td><input type="checkbox"/> SRB Stack</td> </tr> <tr> <td><input type="checkbox"/> ET/SRB Mate</td> </tr> <tr> <td><input type="checkbox"/> Orbiter Rollout/Mate</td> </tr> <tr> <td><input type="checkbox"/> VAB Rollout</td> </tr> <tr> <td><input type="checkbox"/> TRR/FRF</td> </tr> <tr> <td><input type="checkbox"/> FRR/Launch</td> </tr> <tr> <td><input type="checkbox"/> Ferry Flight</td> </tr> </table>	<input type="checkbox"/> Delta LSFR	<input type="checkbox"/> SRB Stack	<input type="checkbox"/> ET/SRB Mate	<input type="checkbox"/> Orbiter Rollout/Mate	<input type="checkbox"/> VAB Rollout	<input type="checkbox"/> TRR/FRF	<input type="checkbox"/> FRR/Launch	<input type="checkbox"/> Ferry Flight
<div style="display: flex; justify-content: space-between;"> <div> CRITICALITY YES NO </div> <div> <input type="checkbox"/> No flight or industrial safety impact <input type="checkbox"/> Flight & industrial safety impacts have been identified & incorporated </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> 1, 1R, 1S 2, 2R </div> <div> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">15</div> </div> </div>	SCHEDULE IMPACT: <div style="text-align: center; border: 1px solid black; border-radius: 50%; width: 40px; margin: 0 auto;">18</div>											
<input type="checkbox"/> Delta LSFR												
<input type="checkbox"/> SRB Stack												
<input type="checkbox"/> ET/SRB Mate												
<input type="checkbox"/> Orbiter Rollout/Mate												
<input type="checkbox"/> VAB Rollout												
<input type="checkbox"/> TRR/FRF												
<input type="checkbox"/> FRR/Launch												
<input type="checkbox"/> Ferry Flight												
COST IMPACT: SSU APA (Production) APA (Operations)	<div style="border: 1px solid black; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">19</div>	FY __	FY __	FY __	FY __	FY __	FY __	TOTAL				
IMPACT DESCRIPTION: <div style="text-align: center; border: 1px solid black; border-radius: 50%; width: 40px; margin: 0 auto;">20</div>												
IMPACT OF NONINCORPORATION: <div style="text-align: center; border: 1px solid black; border-radius: 50%; width: 40px; margin: 0 auto;">21</div>												
RECOMMENDATION/REMARKS: <div style="text-align: center; border: 1px solid black; border-radius: 50%; width: 40px; margin: 0 auto;">22</div>							RECOMMENDED HANDLING: <input type="checkbox"/> Routine <input type="checkbox"/> Expedite to					
FORWARDING AUTHORIZATION												
SIGNATURE (SPACE SHUTTLE BOARD MEMBER)							DATE					
<div style="border: 1px solid black; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">23</div>												

SSP Form 4000B (Rev Aug 00)

INSTRUCTIONS FOR PREPARATION OF SPACE SHUTTLE PROGRAM CHANGE REQUEST

(Figure C-1)

- A. General Instructions - An "SSP Change Request" shall be prepared for all proposed changes to the SSP Requirements Baseline. If the information required by the form is adequately provided in the data package accompanying the proposed change, the information need not be restated on the form itself, but summarized and/or identified on this form with a reference to the appropriate backup document and paragraph. If the information requested by a block on the form is not known, that fact shall be noted on the form. Space Shuttle Program Document Continuation Sheets (Figure C-3) shall be used as necessary.
- B. Completion Instructions - Complete each block on the form as follows:
1. The PCIN will be provided by the Space Shuttle PRCB Secretary in accordance with the criteria defined in Paragraph 4.4.4 of basic document (Volume IV).
 2. Enter the SSP CR number; i.e., SXXXXXX.
 3. Use SSP Document Continuation Sheets as necessary (see Figure C-3). Enter the specific and total number of pages here.
 4. Check N/A-to-acceptance, prior-to acceptance, or post-acceptance box as appropriate. If the prior-to-acceptance box is checked, the threshold exceeded - design control weight and/or costs - must be specified in the CR.
 5. Enter the name of the individual who initiated the change, the individual's office mail code, and the phone number, which should include the area code.
 6. Change title is as brief a statement as possible by which the change can be understood.
 7. List all change proposals (ECPs, RECPs, SCNs, IRNs, etc.) that are being addressed by this "SSP Change Request". A copy of these documents should accompany the CR.
 8. List all SSP documents known to be affected by this change including baseline documents, specifications, ICDs, plans, procedures, manuals, drawings, etc.

**INSTRUCTIONS FOR PREPARATION OF
SPACE SHUTTLE PROGRAM CHANGE REQUEST - Continued**

9. The description of the change shall be a complete and concise statement of what the Space Shuttle board is requested to approve. If the change includes a change to baselined requirements, the description of change shall include a statement of the present requirement, a reference to the paragraph(s) of the baselined document(s) where the requirement is documented, and the precise wording that is proposed to replace the present wording of the requirement.
10. Enter a complete statement of the reason for the proposed change.
11. This information to be entered by SSP-MG/Space Shuttle Management Integration to establish Space Shuttle board planning information.
12. Identify all system elements affected by the proposed change.
13. Identify the impact of the proposed change on the system parameters listed and describe the impact in Block 20.
14. Identify the specific flight(s), test program(s), hardware/software item(s), or non-flight specific time period for the proposed change. (Examples are shown below). For flight specific changes, place an "X" by the milestone for which implementation of the change should be complete.
 - a. STS-50
 - b. STS-50 through 999
 - c. OV-103, Flight 17
 - d. STS-50, OV-103
 - e. ET-37 through ET-40
 - f. SSME, 2019, 2022, 2028
 - g. Non-flight specific
15. Place an "X" in the appropriate space to indicate whether or not the proposed change affects hardware/software currently defined as criticality category 1, 1R, 1S, 2 or 2R.

**INSTRUCTIONS FOR PREPARATION OF
SPACE SHUTTLE PROGRAM CHANGE REQUEST - Concluded**

16. Place an "X" in the appropriate space to indicate whether the proposed change has no flight or industrial safety impact or that impact(s) have been identified and incorporated. Describe further in Block 20 if required. This data is mandatory for submission.
17. Identify the weight impact to the individual system element(s) affected. Describe further in Block 20 if required. This data is mandatory for submission.
18. Identify the system element(s) impacted and the magnitude of the schedule impact. Describe the reason for this in Block 20.
19. Identify the estimated increase or decrease in cost relative to the latest approved POP in millions of real year dollars. Show cost for SSU, APA (Production), and APA (Operations) and enter by fiscal years. Identify the cause of the impact in Block 20.
 - TBD - (To Be Determined) use in place of number
 - + - use preceding TBD to indicate cost increase
 - - use preceding TBD to indicate cost savings
 - CA - (Cost Avoidance) use when proposed change would avoid expenditure of approved funds.

If there is no impact, so state or indicate by placing a zero in the appropriate block(s).
20. Describe each impact noted in Blocks 13, 16, 17, 18 and 19. Also include any impact to ascent flight performance.
21. Describe the impact to the program of not approving the proposed change.
22. This block should be used to provide any additional information that might aid the Space Shuttle board Chair in making a decision on the proposed change.
23. A proposed SSP change must be reviewed and sponsored by a Space Shuttle board member prior to being formally presented to the board. The CR form must be signed by a board member or designated representative.
24. Indicate whether the change should be handled routinely, expedited to a specific Space Shuttle board in accordance with Appendix K, or dispositioned outside the board.

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FIGURE C-2

SPACE SHUTTLE PROGRAM ICB CHANGE REQUEST/DIRECTIVE

RECORD #:	SPACE SHUTTLE PROGRAM ICB CHANGE REQUEST/DIRECTIVE	PAGE: 1 OF 2 DATE:
(1)		(4)
CR/DIR NUMBER:	CHANGE TITLE:	
(2)	(3)	
DOCUMENT(S) AFFECTED (NUMBER & TITLE):		PAYLOAD:
(5)		(6)
		FLIGHT NUMBER(S):
		(7)
WEIGHT IMPACT:	APPLICABLE FREEZEPOINT:	DATE SCHEDULED:
(8)	(9)	(10)
	<input type="checkbox"/> FDRD <input type="checkbox"/> CIR <input type="checkbox"/> FPSR <input type="checkbox"/> L-4MO <input type="checkbox"/> DLSFR <input type="checkbox"/> FOR <input type="checkbox"/> CCCR <input type="checkbox"/> OTHER	(11)
DESCRIPTION OF CHANGE:		
(12)		
JUSTIFICATION:		
(13)		
ACTION:		
(14)		
INITIATOR/ORG/MAIL CODE/PHONE NO:	DATE:	INIT. MGT. APPROVAL/ORG/MAIL CODE: DATE:
(15)		(16)
OFFICE OF PRIMARY RESPONSIBILITY (OPR):	DATE:	
(17)	TO IPT: <input type="checkbox"/>	CONCUR <input type="checkbox"/> NON-CONCUR <input type="checkbox"/>
***** CONCURRENCE *****		
DATE:		DATE:
(18)		
DATE:		DATE:
***** DISPOSITION *****		
<input type="checkbox"/> APPROVED <input type="checkbox"/> WITHDRAWN <input type="checkbox"/> APPROVED WITH CUSTOMER CHANGES INDICATED <input type="checkbox"/> APPROVED WITH <u>SSP</u> CHANGES INDICATED <input type="checkbox"/> DISAPPROVED	(19)	<input type="checkbox"/> APPROVED <input type="checkbox"/> WITHDRAWN <input type="checkbox"/> APPROVED WITH <u>SSP</u> CHANGES INDICATED <input type="checkbox"/> APPROVED WITH CUSTOMER CHANGES INDICATED <input type="checkbox"/> DISAPPROVED
SIGNATURE: PAYLOAD MANAGER	DATE:	SIGNATURE: SSP INTEGRATION MANAGER DATE:

SSP Form 4040 (Rev May 98)

FIGURE C-2

SPACE SHUTTLE PROGRAM ICB CHANGE REQUEST/DIRECTIVE

RECORD #:	20	SPACE SHUTTLE PROGRAM ICB CHANGE REQUEST/DIRECTIVE CONTINUATION SHEET	PAGE: <u>2</u> OF ____ DATE:
CR/DIR NUMBER:	CHANGE TITLE:		
DESCRIPTION OF CHANGE:			

SSP Form 4041 (Rev Sept 95)

**INSTRUCTIONS FOR PREPARATION OF
SPACE SHUTTLE PROGRAM INTEGRATION CONTROL BOARD
CHANGE REQUEST/DIRECTIVE**

(Figure C-2)

- A. General Instructions - The Integration Control Board (ICB) CR/Directive (SSP Form 4040) and the Continuation Sheet (SSP Form 4041) are used to process changes to payload integration documents approved by the Manager, Space Shuttle Customer and Flight Integration as listed in Appendix F and to document changes approved by the DMICB. SSP Forms 4040 and 4041 are also used to submit ICB CRs signed by the Flight Managers and JMICB CRs.
- B. Completion Instructions - Complete each block on the form as follows:
1. Record Number - The record number is provided by CM based on Automated Mission and Payload Tracking System (AMPTS) generated data and is available when the CR/DIR number is assigned.
 2. CR/DIR Number - This number will be assigned by the Space Shuttle Management Integration Office (CM). Call CM - AMPTS Support at 281-283-7549 (primary) or 281-283-7542 (secondary) for all number assignments, including CR/DIR revision number assignments.
 3. Change Title - This is the title of the CR/DIR and should reflect the most relevant subject of the change or directive.
 4. Date - Enter date CR/DIR number is assigned; no other date is acceptable.
 5. Documents Affected - List the document number and the name of the document. If the CR affects a multipart PIP annex, the annex part number must be shown under document affected (e.g., SSP 14019 Annex 2, Part II). CM may be contacted for this information.
 6. Payload - Name or acronym assigned to payload affected by this CR (example: TDRS).
 7. Flight Number - If not applicable, leave blank. If applicable, fill in the flight number(s) affected by this CR (example: STS-35; STS-32 and subs; STS-35, STS-42, STS-37, or ALL).

**INSTRUCTIONS FOR PREPARATION OF
SPACE SHUTTLE PROGRAM INTEGRATION CONTROL BOARD
CHANGE REQUEST/DIRECTIVE - Continued**

8. Weight Impact - Estimate weight impact (lb.). If no inputs are required, use NONE or not applicable (N/A). Do not leave the field blank.
9. Enter most constraining applicable freezepoint based on change content. Do not leave the field blank.
10. Enter current scheduled date of applicable freezepoint. Do not leave the field blank.
11. Other Impacts - Estimate all other impacts (hardware, mission timeline, launch site, crew timeline, thermal, avionics, structures, mechanical, etc.).
12. Description of Change - Indicate exact wording to be incorporated. Show proposed change by section, then identify page, paragraph, sentence, or drawing; indicate was/is situation by striking through the deleted text and following it with the new text to emphasize actual changed portions as CR reviewers can analyze changes to the text more easily. Additions or deletions of entire sections/paragraphs do not require highlighting. Use continuation sheets as necessary.
13. Justification - Indicate justification for proposed change.
14. Action - This block is used to list any actions required after the CR/DIR has been dispositioned. A CR/DIR originator may indicate an action.
15. Initiator/Org/Mail Code/Phone Number - Initiator's signature, organization, mail code, phone number. All signatures must be dated. Please print or type name beneath signature.
16. Initiator Mgmt Approval/Org/Mail Code - Approval signature, organization, mail code. All signatures must be dated. Please print or type name beneath signature.
Payload: Customer Initiator's Supervisor, if required, or
NASA: Space Shuttle Program Office delegated representative.
17. Office of Primary Responsibility (OPR) - This block is reserved for the OPR signature as designated by CM. It is not required if the initiator or initiating management is also the OPR. Each CR must have an OPR signature as designated by CM before being submitted for evaluation with an OPR non-concurrence. All signatures must be dated.

**INSTRUCTIONS FOR PREPARATION OF
SPACE SHUTTLE PROGRAM INTEGRATION CONTROL BOARD
CHANGE REQUEST/DIRECTIVE - Concluded**

18. Concurrence - These blocks are reserved for general concurrence. The initiating organization (customer or NASA) shall use the left side of the concurrence area to sign and date. Any mandatory overflow concurrences may be placed on the right side. If signatures in this area are non-concurring, then, the signer should print the word "non-concur" next to his signature. If CR/DIR is payload customer-initiated, the appropriate NASA document manager must sign prior to submittal to the SSP Integration Control Board (ICB). All signatures must be dated. Please print or type name beneath signature.
19. Disposition - Disposition is indicated in the appropriate box by the authorizing official (Payload Manager in left-hand block, Space Shuttle Program Office authority in right-hand block) at the time the CR is signed and dated.
20. Continuation Sheet - This sheet may be used to continue any item from the ICB CR/Directive.

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FIGURE C-3

SPACE SHUTTLE PROGRAM DOCUMENT CONTINUATION SHEET

PCIN <div>1</div>	SPACE SHUTTLE PROGRAM DOCUMENT CONTINUATION SHEET	PAGE _____ OF <div>3</div>
<div>2</div>		DATE <div>5</div>
DOCUMENT: <div>4</div>		
<div>6</div>		

SSP Form 4001 (Rev Apr 93)

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INSTRUCTIONS FOR PREPARATION OF SPACE SHUTTLE PROGRAM DOCUMENT CONTINUATION SHEET

(Figure C-3)

- A. General Instructions - This form is provided as a general purpose continuation sheet for the "SSP Change Request" (Figure C-1), the "Program Requirements Control Board Directive" (Figure C-6), the "Change Evaluation" (Figure C-4), and other SSP documents as appropriate. The use of this standard form will aid change tracking, help provide documentation clarity, and enable the documentation to be more easily understood.
- B. Completion Instructions - Complete each block on the form as follows:
1. Enter the same PCIN appearing on the document being continued.
 2. Enter the same number in this block as the document being continued.
 3. Number each page and total pages as indicated. Use additional continuation sheets as necessary.
 4. Identify the document being continued.
 5. Enter the same date appearing on the document being continued.
 6. Identify by block title the block being continued. Insert "(cont.)" and underline. Begin the continuation words on the next lower line. Any number of blocks can be continued on a single continuation sheet, but each block should be identified separately as noted above in the same manner.

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FIGURE C-4

PROGRAM CHANGE EVALUATION

PCIN	1	PROGRAM CHANGE EVALUATION	PAGE <u>1</u> OF <u>3</u>	
CR NO.	2		BOARD TYPE	OPR
			5	6
EVALUATED BY: OFFICE: PHONE #:				
CHANGE TITLE:				
IMPACT DESCRIPTION:				
8				
IMPACT OF NONINCORPORATION:				
9				
RECOMMENDATION/REMARKS:				
10				
APPROVED BY:				
11				
SIGNATURE (BOARD MEMBER)			DATE	

SSP Form 4002 (Rev Apr 95)

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INSTRUCTIONS FOR PREPARATION OF PROGRAM CHANGE EVALUATION

(Figure C-4)

- A. General Instructions - This form is intended to be used by each organization performing evaluations and impact assessments of proposed changes to the Program Requirements Baseline. One form is to be provided for each change evaluated. Space Shuttle Program Document Continuation Sheets may be used as required (see Figure C-3). The evaluation form for the proposed change shall be provided to the Program Board Secretary in accordance with the due date identified on the CR OPR/evaluations requested form. These will be used by the OPR to assemble a summary assessment of the change in accordance with Figure C-5 for use at the appropriate Program Board meeting.
- B. Completion Instructions - Complete each block on the form as follows:
1. Enter the same PCIN appearing on the "SSP Change Request" being evaluated.
 2. Enter the CR number of the SSP CR being evaluated.
 3. Use SSP Document Continuation Sheets as required. Enter the specific and total number of pages here.
 4. Enter the name of the individual who is providing the evaluation, the individual's office mail code, and the phone number, which should include the area code.
 5. Enter the scheduled Program Board type, i.e., PRCBD, JPRCB, Phase 1.
 6. The OPR will be identified by the PRCB Secretary during the CRG.
 7. Enter the same title that appears on the SSP CR.
 8. Identify the impact of the proposed change. Include weight, cost, and schedule impacts if any. A weight impact or ascent flight performance data statement is mandatory.
 9. Identify the impact of not incorporating the proposed change into SSP Requirements Baseline.
 10. Provide an overall recommendation as to the disposition of the proposed change.

**INSTRUCTIONS FOR PREPARATION OF
PROGRAM CHANGE EVALUATION - Concluded**

11. The Change Evaluation shall be approved by the Program board member for the organization/office identified in Block 4 prior to being forwarded to a board for action.

FIGURE C-5

PRESENTATION SUMMARY CHART
(Page 1 of 2)

CR NUMBER 1

TITLE: 2

PRESENTER: 3

DESCRIPTION OF CHANGE:
4

BACKGROUND:
5

FIGURE C-5

PRESENTATION SUMMARY CHART

(Page 2 of 2)

EVALUATIONS:

6

FOR:

FOR/COMMENT:

AGAINST:

NOT AFFECTED:

EFFECTIVITY:

7

8

COST: FY_____ FY_____ FY_____ FY_____ FY_____ FY_____ FY_____ TOTAL _____

WEIGHT:

9

SCHEDULE:

10

OPEN ISSUES:

11

RECOMMENDATIONS:

12

INSTRUCTIONS FOR PREPARATION OF SPACE SHUTTLE PRCB PRESENTATION SUMMARY CHART

(Figure C-5)

- A. General Instructions - This form is provided as a general purpose information sheet for the Space Shuttle PRCB presentation material. The use of this form will provide the Space Shuttle PRCB members with a summary of the proposed change and the programmatic impacts in a clear, concise, and consistent manner.
- B. Completion Instructions - Complete each block on the form (Figure C-5) as follows.
1. Enter the CR number.
 2. Use the title as it appears on the CR.
 3. Enter the office code and presenter's name.
 4. Briefly describe what SSP requirements need revision, e.g., revise Volume X to add Range Safety System.
 5. Provide a brief summary of significant prior events or actions relevant to the board's understanding of this proposed change.
 6. Identify the organizations in the appropriate line per the evaluation from that office using the official organizational title.
 7. Indicate specific program effectivity.
 8. Adequate presentation and discussion of all program cost estimates is essential. If no cost impact, give rationale for reaching this conclusion.
 9. Enter the SSP weight impact to the individual project hardware elements affected.
 10. Enter the project elements impacted and the magnitude of the schedule impact.
 11. Identify any unresolved issues, provide presenter's recommendations for resolution with rationale for the recommendations. Explain alternate approaches that were considered.
 12. Provide an OPR recommended action to disposition the change.

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FIGURE C-6

SPACE SHUTTLE PROGRAM PRCB DIRECTIVE

PCIN <div style="text-align: center;">①</div>	SPACE SHUTTLE PROGRAM REQUIREMENTS CONTROL BOARD DIRECTIVE	PAGE <u>1</u> OF <div style="text-align: center;">③</div>
PRCBD NO. <div style="text-align: center;">②</div>		<div style="text-align: center;">④</div>
CHANGE TITLE: <div style="text-align: center;">⑤</div>		
CHANGE PROPOSAL(S) NO. AND SOURCE <div style="text-align: center;">⑥</div>		DOCUMENTS AFFECTED (NO., TITLE, PARA.) <div style="text-align: center;">⑦</div>
INITIATED BY: <div style="text-align: center;">⑧</div>	SUBMITTED BY: <div style="text-align: center;">⑨</div>	
SSP BASELINE CHANGE DIRECTION:		<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: right;"> OPR: / BOARD: </div> <div style="display: flex; align-items: center;"> <div style="text-align: center;">⑩</div> <div style="text-align: center;">⑪</div> <div style="text-align: center;">⑪A</div> </div> <div style="text-align: center; margin-top: 10px;">⑫</div> </div>
⑬		
AUTHORIZATION: <div style="text-align: center;">⑭</div>		
<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> SIGNATURE (CHAIR SPACE SHUTTLE PRCB)		<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> DATE

SSP Form 4003 (Rev Apr 93)

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INSTRUCTIONS FOR PREPARATION OF SPACE SHUTTLE PRCB DIRECTIVE

(Figure C-6)

- A. General Instructions - This form will be prepared by the Space Shuttle PRCB Secretary. The PRCBD is used by the Space Shuttle PRCB Chair to disposition proposed changes to the SSP Requirements Baseline and to assign actions to implement decisions by the Chair. Space Shuttle Program Document Continuation Sheets (see Figure C-3) may be used as necessary.
- B. Completion Instructions - The Space Shuttle PRCB Secretary shall complete each block on the form as follows:
1. Enter the same PCIN appearing on the "SSP Change Request" which the PRCBD is intended to implement.
 2. Enter the PRCBD number, i.e., SXXXXXX. For PRCBD revisions enter an "R" suffix and Arabic number to identify the revision number, for example: SXXXXXXR1, SXXXXXXR2, etc.
 3. Use SSP Document Continuation Sheets as required. Enter the specific and total number of pages here.
 4. Enter the date of the meeting which dispositioned the change resulting in this directive. In cases where the PRCBD is processed outside the formal PRCB, enter a pound sign (#).
 5. Enter the same "change title" that was entered on the "SSP Change Request".
 6. List the change proposal numbers and sources which are affected by this direction.
 7. List the documents known to be affected by this change including baseline documents, specification, ICDs, plans, procedures, manuals, drawings, etc.
 8. Enter the name and office identity of the individual who first proposed the change.
 9. Enter the name of the PRCB member who authorized the forwarding of the change for disposition.
 10. Enter the office code of the OPR.

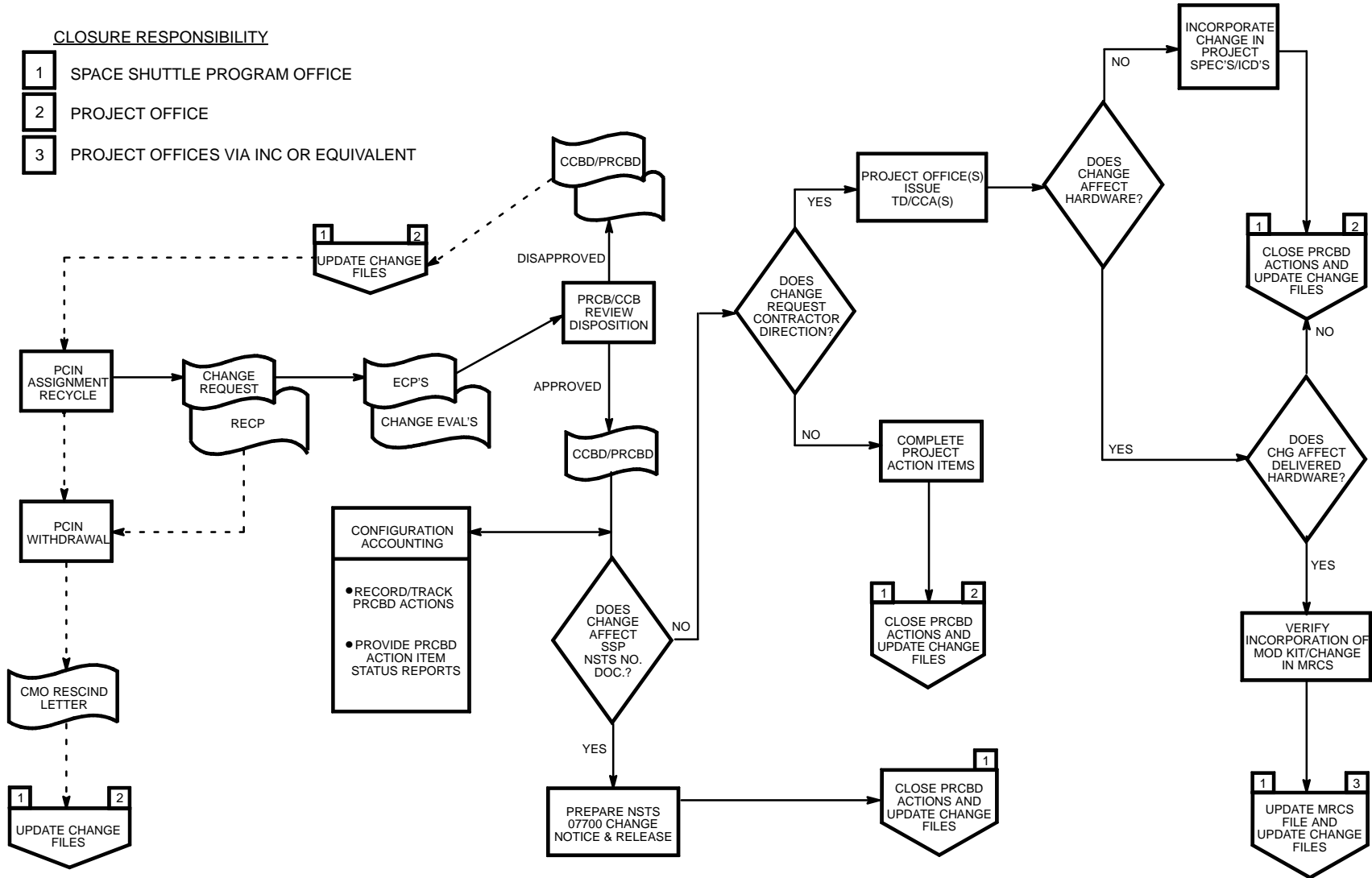
**INSTRUCTIONS FOR PREPARATION OF
SPACE SHUTTLE PRCB DIRECTIVE - Concluded**

11. Enter the initials of the person (11) who prepares the directive. When the directive is entered into BARS, the data entry person shall enter their initials (11A) after the initials of the directive writer.
12. Enter the type of Space Shuttle meeting that dispositioned the change.

NOTE: When field (12) is filled in with a meeting type, this will cause an identical disposition to be printed in field (4) listed above.

13. Enter the meeting disposition of the change, describe the specific program direction to be implemented by the SSP organization(s), specify the SSP cost, weight, ascent flight performance, and schedule impacts authorized by the direction, and identify the specific actions, action assignees, effectiveness, and due dates for the actions required to properly implement the direction. When a change is dispositioned outside the formal Space Shuttle PRCB, a pound sign (#) shall be entered on the last line of Block 13 followed by the statement "This PRCBD was processed outside the formal _____". (NOTE: Enter the applicable board which dispositioned the change)
14. The PRCBDs for the SSP shall be authorized only by the Manager, Space Shuttle Program, or designee.

FIGURE C-7
PRCBD ACTION ITEM CLOSURE LOGIC



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FIGURE C-8

SPACE SHUTTLE PROGRAM CHANGE ACTION REQUEST

SPACE SHUTTLE PROGRAM CHANGE ACTION REQUEST																									
PCIN/CR/SR/PRCBD/ACTION NO: 1																									
SUBJECT/TITLE: 2																									
CURRENT STATUS: SCHEDULED TO _____ <div style="text-align: right; margin-right: 100px;">DATE(S)/MEETING(S)</div>																									
BEING PROCESSED OSB 3 NEW CR: OTHER:																									
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 25%;">REQUESTED ACTION:</th> <th style="text-align: left; width: 25%;">BOARD:</th> <th style="text-align: left; width: 15%;">DATE</th> <th style="text-align: left; width: 15%;">DATE</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> SCHEDULE TO</td> <td><input type="checkbox"/> PROCESS OSB</td> <td><input type="checkbox"/> PRCB</td> <td><input type="checkbox"/> SASCB</td> </tr> <tr> <td><input type="checkbox"/> RESCHEDULE TO</td> <td><input type="checkbox"/> CORRECT ERROR</td> <td><input type="checkbox"/> DAILY PRCB</td> <td><input type="checkbox"/> SSUPRCB</td> </tr> <tr> <td><input type="checkbox"/> EXPEDITE TO</td> <td><input type="checkbox"/> WITHDRAW CR 4</td> <td><input type="checkbox"/> ICB</td> <td><input type="checkbox"/> JPRCB</td> </tr> <tr> <td><input type="checkbox"/> OTHER</td> <td><input type="checkbox"/> IMSCCB</td> <td></td> <td></td> </tr> </tbody> </table>						REQUESTED ACTION:	BOARD:	DATE	DATE	<input type="checkbox"/> SCHEDULE TO	<input type="checkbox"/> PROCESS OSB	<input type="checkbox"/> PRCB	<input type="checkbox"/> SASCB	<input type="checkbox"/> RESCHEDULE TO	<input type="checkbox"/> CORRECT ERROR	<input type="checkbox"/> DAILY PRCB	<input type="checkbox"/> SSUPRCB	<input type="checkbox"/> EXPEDITE TO	<input type="checkbox"/> WITHDRAW CR 4	<input type="checkbox"/> ICB	<input type="checkbox"/> JPRCB	<input type="checkbox"/> OTHER	<input type="checkbox"/> IMSCCB		
REQUESTED ACTION:	BOARD:	DATE	DATE																						
<input type="checkbox"/> SCHEDULE TO	<input type="checkbox"/> PROCESS OSB	<input type="checkbox"/> PRCB	<input type="checkbox"/> SASCB																						
<input type="checkbox"/> RESCHEDULE TO	<input type="checkbox"/> CORRECT ERROR	<input type="checkbox"/> DAILY PRCB	<input type="checkbox"/> SSUPRCB																						
<input type="checkbox"/> EXPEDITE TO	<input type="checkbox"/> WITHDRAW CR 4	<input type="checkbox"/> ICB	<input type="checkbox"/> JPRCB																						
<input type="checkbox"/> OTHER	<input type="checkbox"/> IMSCCB																								
OTHER: 5																									
SUPPORTING RATIONALE: 6																									
PRESENTER: 7 OFFICE: PHONE:																									
CONCURRENCES:																									
REQUESTOR 8																									
OPR																									
APPROVAL: 9																									
PRCB SECRETARY																									

SSP Form 4029 (Rev Jul 97)

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INSTRUCTIONS FOR PREPARATION OF SPACE SHUTTLE PROGRAM CHANGE ACTION REQUEST

(Figure C-8)

- A. General Instructions - An SSP Change Action Request ("Blue Sheet") shall be prepared to direct that a necessary change processing action be performed. Requested actions normally include rescheduling PRCB presentation of a CR or an assigned action, authorization to process a CR outside the formal Space Shuttle PRCB, withdrawal of a CR, or cancellation of a PCIN (prior to CR submittal). In limited cases, requested actions may also include authorization to:

1. Prepare a new Space Shuttle PRCBD.
2. Revise an existing PRCBD.
3. Authorize Directive Writer to modify SSP CR implementation (when coordinated with the change initiator for preparation of a Space Shuttle PRCBD).
4. Incorporate Type 2 errata into document (corrections of errors discovered after distribution of a document or updates).
5. Retire deviations/waivers of SSP requirements when effectivities have expired and all related actions have been closed.

- B. Completion Instructions - Complete each block of the form as follows:

1. Enter applicable number (PCIN, CR, SR, PRCBD or PRCBD w/assigned action).

NOTE: If the requested action pertains to an action assigned by a PRCBD, enter the action number after the PRCBD number. If the requested action is to incorporate errata, enter the number(s) of the PRCBD(s) that authorized the document, or update(s), containing the error(s).

2. Enter the change title or the subject, as appropriate.
3. Provide current status information, including scheduled date(s) and meeting(s) (ICB, PRCB, etc.), Outside the Board (OSB) processing, or other status as appropriate. New CR is checked if CR has not been scheduled to PRCB by CRG.

**INSTRUCTIONS FOR PREPARATION OF
SPACE SHUTTLE PROGRAM CHANGE ACTION REQUEST - Concluded**

4. Check the appropriate box(es) that correspond(s) to the type of action you are requesting. If the request is to "Schedule To", "Reschedule To", or "Expedite To" a PRCB or Daily PRCB, then the date should be supplied as appropriate. If the action is not specifically identified on the form, check the "Other" box and provide a summary of the action requested. The following abbreviated statements shall be used, when applicable:
 - a. Modify pre-authorized Directive
 - b. Errata - no PRCBD required
 - c. Retire Deviation(s)/Waiver(s) - no PRCBD required

If necessary, use the additional lines in the "Other" block to describe the requested action. If additional space is required, use a "Document Continuation Sheet" form.

5. Enter an action not listed under requested action.
6. Enter any additional data or conditional factors required to provide appropriate rationale for the request. When the request is to correct an error in a CR or PRCBD, the error type (missing or incorrect data, typographical error, etc.) and probable cause shall be described.
7. Enter Board presenter's name, office code and office phone number.
8. Enter the dated signature of the request originator, the OPR person concurring with the CAR, office managers and any other concurrences required to adequately coordinate the change.
9. The completed CAR shall be approved by the Space Shuttle PRCB Secretary.

FIGURE C-9
PRCBD ACTION CLOSEOUT REQUEST

PRCBD ACTION CLOSEOUT REQUEST			
PRCBD NO:	(1)	ACTION ITEM NO:	(2)
TITLE:	(3)	ACT OPR.:	(4)
		ACTIONEE:	(6)
ACTION DESCRIPTION:	(5)		
	(7)		
ACTION DUE DATE:	(8)		
SCHEDULED BOARD TYPE:	(9)		
CLOSURE RATIONALE:			
ACTIONEE:	(10)	DATE:	
OPR CONCURRENCE: (IF REQUIRED)	(11)	DATE:	
SSP-MG/MANAGEMENT INTEGRATION USE ONLY			
CMO RECEIPT:	(12)	DATE:	
APPROVAL			
PRCB SECRETARY:	(13)	DATE:	
BARS:	(14)	DATE:	
		RECORDS:	(15) DATE:

SSP Form 4030 (Rev Apr 96)

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INSTRUCTIONS FOR PREPARATION OF SPACE SHUTTLE PRCBD ACTION CLOSEOUT REQUEST

(Figure C-9)

- A. General Instructions - A PRCBD Action Closeout Request ("Pink Sheet") shall be prepared by the actionee to document the closeout of PRCBD action items. The preparation of this form provides the closure rationale and traceability of implementation of the Space Shuttle PRCB direction. The form must be as complete as possible and must provide adequate information to allow a close-out decision to be made. The form may be attached to existing documentation such as correspondence, briefing charts, etc., when such documentation provides proof of action implementation. The form shall be submitted to the Space Shuttle PRCB Secretary.
- B. Completion Instructions - Complete each block of the form as follows:
1. Enter the PRCBD number that assigned the action.
 2. Enter the action item number.
 3. Enter the title of the initiating directive.
 4. Enter the office code of the action OPR.
 5. Enter the initiating action item description. The action description shall be complete as it appeared on the original directive.
 6. Enter the office code of the actionee.
 7. Enter the action due date, current milestone date, or assigned need date.
 8. Enter the appropriate scheduled Board type (i.e., PRCB, LSFR, Daily, etc.). If scheduled Outside the Board (OSB), leave blank.
 9. Enter a complete description of the activities that satisfy the requirements imposed by the original action item. This description shall provide conclusive proof that the action has been closed.
 10. Enter the signature of the actionee and date.
 11. If required, obtain the dated signature of the OPR.
 12. Enter the initials of the CMO person recommending closure of the action and date.

**INSTRUCTIONS FOR PREPARATION OF
SPACE SHUTTLE PRCBD ACTION CLOSEOUT REQUEST - Concluded**

13. Enter the initials of the Space Shuttle PRCB Secretary or his designated representative validating closure of the action and date.
14. Enter the initials of the person who updates the BARS files to record closure of action and date.
15. Enter the initials of the person updating the PRCB records to document closure of the action and the date.

FIGURE C-10

**SPACE SHUTTLE PROGRAM/SPACE STATION PROGRAM
JPRCB DIRECTIVE**

PCIN (1)	SPACE SHUTTLE PROGRAM/ SPACE STATION PROGRAM JPRCB DIRECTIVE	PAGE <u>1</u> OF (3)
PRCBD NO. (2)		(4)
CHANGE TITLE: (5)		
CHANGE PROPOSAL(S) NO. AND SOURCE (6)	DOCUMENTS AFFECTED: (NO., TITLE, PARA.) (7)	
INITIATED BY: (8)	SUBMITTED BY: (9)	
BASELINE CHANGE DIRECTION:		OPR: (10) BOARD: (12) (11) / (11A)
(13)		
AUTHORIZATION: (14)		
_____ MANAGER, SPACE SHUTTLE PROGRAM	_____ DATE	_____ MANAGER, SPACE STATION PROGRAM _____ DATE

SSP Form 4035 (Rev Sept 95)

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INSTRUCTIONS FOR PREPARATION OF SPACE SHUTTLE PROGRAM/SPACE STATION PROGRAM JPRCB DIRECTIVE

(Figure C-10)

- A. General Instructions - The SSP/International Space Station Program (ISSP) Joint Program Requirements Control Board (JPRCB) Directive is used by the SSP/ISSP to disposition proposed changes to the joint SSP/ISSP baseline and to formally assign actions to either program.
- B. Completion Instructions - Complete each block on the form as follows:
1. Enter the same PCIN that appears on the SSP or ISSP Change Request which the Directive is intended to disposition. If there is no CR, enter the associated PCIN.
 2. Enter the PRCBD number with the letter "A" as a prefix to signify joint SSP/ISSP authority, i.e., AXXXXXX. For PRCBD revisions, enter the letter "R" as a suffix and a sequential Arabic number to identify the revision (e.g., AXXXXXXR1, AXXXXXXR2, etc.).
 3. Enter the specific and total number (3) of pages of the Joint Directive. Use SSP/ISSP Document Continuation Sheets as necessary (See Figure C-11).
 4. Enter the date of the JPRCB at which the CR or action prompting the Directive was dispositioned or levied. In cases where the SSP/ISSP Directive is to be processed outside the formal JPRCB, enter a pound sign (#) in this block. The "#" is then defined in a footnote in the body of the Directive (See block 13).
 5. Enter the same "CHANGE TITLE" that appears on the SSP Change Request. If the Directive serves only to assign action(s), or if there is no CR, provide an appropriate concise title.
 6. List the change proposal(s) number and source(s) of the change (e.g., Chit, CR, etc.).
 7. List the documents known to be affected by this change including baseline documents, plans, procedures, manuals, etc.
 8. Enter the program, NASA site, and office code of the change initiator, followed by their first initial and last name (e.g., "SSP-JSC-XX/J. Smith". If the Directive serves only to assign action(s), or if there is no CR, the Space Shuttle JPRCB Secretary is listed as the initiator.

**INSTRUCTIONS FOR PREPARATION OF
SPACE SHUTTLE PROGRAM/SPACE STATION PROGRAM JPRCB
DIRECTIVE - Concluded**

9. Enter the program, NASA site, and office code of the change submitter, followed by their first initial and last name (e.g., "SSP-JSC-XX/J. Smith").
10. Enter the OPR.
11. Enter the initials of the person (11) who prepares the Directive. When the Directive is entered into the BARS data base management system, the data entry operator shall enter their initials (11A).
12. Enter the type of method used for dispositioning the change. Use the following designations:

JPRCB - Joint Program Requirements Control Board

OSB - Outside the Board

NOTE: When field (12) is filled in with one of the dispositions stated above, this will cause an identical disposition to be printed in field (4) listed above.

13. Enter the JPRCB disposition of the change, describe the specific program direction to be implemented by the SSP or ISSP organization(s), specify the cost, weight, and schedule impacts authorized by the direction, identify the specific actions, action assignees, effectivity, and due dates for the actions required to properly implement the direction. When a change is dispositioned outside a formal JPRCB, a "#" shall be entered on the last line of block 13 followed by the statement "This PRCBD was processed outside the formal JPRCB".
14. The PRCBDs shall be authorized and dated by both the Manager, Space Shuttle Program and Manager, Space Station Program or their designees.

FIGURE C-11

**SPACE SHUTTLE PROGRAM/SPACE STATION PROGRAM
DOCUMENT CONTINUATION SHEET**

PCIN (1)	SPACE SHUTTLE PROGRAM/ SPACE STATION PROGRAM DOCUMENT CONTINUATION SHEET	PAGE (3) OF _____
(2)		DATE: (5)
DOCUMENT: (4)		
(6)		

SSP Form 4036 (Rev Oct 94)

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**INSTRUCTIONS FOR PREPARATION OF
SPACE SHUTTLE PROGRAM/SPACE STATION
PROGRAM DOCUMENT CONTINUATION SHEET**

(Figure C-11)

- A. General Instructions - This form is provided as a general purpose continuation sheet for the "SSP/ISSP JPRCB DIRECTIVE" (Figure C-10) and other joint program documents as appropriate. The use of this standard form will facilitate change tracking, help provide documentation clarity, and enable the joint documentation to be more easily understood.
- B. Completion Instructions - Complete each block on the form as follows:
1. Enter the same PCIN appearing on the document being continued.
 2. Enter the same number in this block as the document being continued.
 3. Number each page and total pages as indicated. Use additional continuation sheets as necessary.
 4. Identify the document being continued.
 5. Enter the same date appearing on the document being continued.
 6. Identify by block title the block being continued. Insert "(cont.)" and underline. Begin the continuation words on the next lower line. Any number of blocks can be continued on a single continuation sheet, but each block should be identified separately as noted above in the same manner.

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APPENDIX D

PROCEDURE FOR BASELINING/CHANGING

SPACE SHUTTLE PROGRAM

SYSTEMS INTERFACE CONTROL DOCUMENTS

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APPENDIX D

PROCEDURE FOR BASELINING/CHANGING SPACE SHUTTLE PROGRAM SYSTEMS INTERFACE CONTROL DOCUMENTS

1.0 PURPOSE

The purpose of this appendix is to establish the detailed procedures to be followed for developing and incorporating SSP systems ICDs/IRNs into the formally controlled SSP Requirements Baseline.

2.0 SCOPE

The general requirements for the preparation, coordination, processing and baselining of SSP systems ICDs/IRNs are provided in Paragraphs 3.1.7 and 3.1.8 of the basic portion of this volume. The procedures defined herein to implement these requirements have been designed to assure the maximum possible degree of program-wide coordination of potential SSP requirements, while at the same time keeping the formality and documentation to a minimum. Achieving this in a timely fashion requires the close coordination of the Space Shuttle Systems Integration Office, the appropriate Space Shuttle project offices, the SFOC Contractor, and the appropriate NASA in-house design activity/element contractors.

3.0 RESPONSIBILITY AND AUTHORITY

The SFOC Contractor, as the responsible agent for all SSP systems ICDs maintenance, shall keep the systems ICDs up to date by electronically incorporating approved IRNs and document revisions into the systems ICD TDMS data base.

The SFOC Contractor and appropriate NASA in-house design project/element contractors are responsible for the preparation and coordination of proposed SSP systems ICD/IRNs and for obtaining the appropriate technical concurrence of the interfacing element/project technical representatives. This activity shall be accomplished under the cognizance of USA/Houston chaired IWG consisting of members from all affected organizations. Technical concurrence on a systems ICD/IRN is established at the SSP IWG telecons with the approval of the systems ICD/IRN by the SSP IWG for submission to the ICB/PRCB. The systems ICD/IRN or SSP CR may be routed to the ICB/PRCB for baselining or processed outside of the board.

3.1 CONCURRENCE AND APPROVAL

Concurrence and approval of SSP basic systems ICDs, IRNs, and revised systems ICDs shall be as follows:

3.1.1 Basic SSP Systems ICDs

For a basic SSP systems ICD created as an initial program document, the following approval/concurrence signatures are required:

- a. Approval of the Manager, Space Shuttle Systems Integration Office
- b. Concurrence by the appropriate project managers or their designated representatives
- c. Concurrence by the SFOC program manager or a designated representative
- d. Concurrence by the appropriate NASA in-house design activity/element contractor managers or their designated representatives

The concurrence signatures shall normally be obtained on the systems ICD prior to baselining. The Manager, Space Shuttle Systems Integration will approve the systems ICD and authorize its release by a PRCBD.

In the event of nonconcurrence, a CE (reference Appendix C) shall be provided by the affected project offices during the normal CE cycle describing the incompatibility and the impact, if any, for Space Shuttle PRCB disposition.

3.1.2 Interface Revision Notice

Changes to a systems ICD shall be accomplished by an IRN. Proposed IRNs ready for submittal to the Space Shuttle PRCB for final approval shall reflect signature concurrence of the SFOC Contractor's designated IWG Chair and the appropriate NASA Project and Integration Office representatives. When approved by the PRCB, the IRN will reflect the PRCBD number and date of approval for incorporation into the systems ICD electronic Technical Document Management System (TDMS).

3.1.3 Revised Systems ICDs

When warranted at the discretion of the IWG Chair, a document revision of an existing systems ICD is processed as a record change IRN to incorporate all IRNs approved since the last revision. This document revision requires only the concurrence of the IWG Chair on the IRN that establishes the revision. A PRCBD, approved by the Manager, Space Shuttle Systems Integration Office, and issued OSB, baselines the revised ICD. The inclusion of changes not previously approved is prohibited since these would be beyond the scope of a record change.

4.0 SSP SYSTEMS ICD/IRN PROCESSING

The flow process to be followed in preparing, coordinating, and baselining SSP systems ICDs/IRNs, are defined in SFOC-PM0092, Product Development Plan for Space Shuttle Program Systems ICDs, PDP MS3-013, see SFOC DRD 1.1.1.1-f. The process flow is

shown in Figure D-1. The responsibilities of the system ICD community are summarized in the following subparagraphs.

4.1 INTERFACE WORKING GROUP

The SSP IWG is the responsible organization for the development, technical coordination, documentation, and maintenance of all SSP systems ICDs. The IWG conducts SSP technical interface review telecons/meetings, prepares minutes of these telecons/meetings reflecting action assignments, directs preparation of proposed SSP ICDs/IRNs, and monitors completion of assigned actions.

4.2 IRN INITIATOR

- a. Obtains technical interface data from project office IWG representatives, Space Shuttle Systems Integration Office, and responsible NASA in-house design activity/element contractors.
- b. Obtains PCIN number and prepares proposed SSP system IRN.
- c. Routes copy of IRN to appropriate NASA Project Offices and contractors for review.
- d. Coordinates proposed IRN technical development with affected NASA in-house design activity/element contractors and Space Shuttle Project Office IWG representatives, as required.
- e. Incorporates comments and identify areas of incompatibilities/issues.
- f. Presents technical issues to SSP IWG for discussion/resolution, as necessary.
- g. Obtains technical concurrence of designated IWG members.
- h. Provides appropriate technical presentation charts, as needed, to support the ICB/PRCB.

4.3 INTERFACE WORKING GROUP CHAIR

- a. Establishes IRN schedule for processing.
- b. Coordinates technical concurrence for all IRNs.
- c. Resolves open issues/differences.
- d. Provides concurrence signature on IRN for processing for Space Shuttle ICB/PRCB review/approval.
- e. Submits change package to the Space Shuttle PRCB Secretary for change processing.
- f. Manages ICD maintenance and new ICD development, as necessary.

4.4 PROJECT OFFICES

- a. Request ECP action from NASA in-house design activity/element contractors, as necessary.
- b. Review IRNs and ECPs received from the NASA in-house design activity/element contractors for impact evaluation.
- c. Provide concurrence signature on IRN for processing for Space Shuttle ICB/PRCB review/approval.
- d. Implement Space Shuttle PRCB approved changes.

4.5 NASA IN-HOUSE DESIGN ACTIVITY/ELEMENT CONTRACTORS

- a. Prepare ECP/change package evaluation, as necessary.
- b. Submit ECP/change package evaluation to the appropriate project office with an information copy to the SFOC Contractor, as necessary.
- c. Review and provide technical input to IRNs.

4.6 SPACE SHUTTLE PRCB SECRETARY

- a. Receives change package including proposed IRN for change processing.
- b. Prepares PRCB directive package for ICB/PRCB or outside of board processing.

4.7 SPACE SHUTTLE ICB/PRCB

- a. Reviews and evaluates proposed SSP IRNs.
- b. Dispositions proposed IRNs.
 - 1. Chair approves as an SSP baseline change by signing PRCBD.
 - 2. Chair disapproves, or requests the proposed IRN be recycled.
 - 3. When there is complete technical agreement by all affected Space Shuttle Program organizations for approval of an ICD change (IRN), and there are no cost, weight, ascent flight performance, or schedule impacts and no impact to other SSP requirements, the authorizing PRCBD may be signed by the Manager, Space Shuttle Systems Integration.
- c. Chair directs project offices by PRCBD to implement change.
- d. Chair directs the SFOC Contractor to electronically incorporate the IRN into the ICD TDMS data base.

4.8 (DELETED)

4.9 (DELETED)

4.10 (DELETED)

4.11 (DELETED)

4.12 (DELETED)

4.13 (DELETED)

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FIGURE D-1

SPACE SHUTTLE SYSTEMS ICD BASELINE AND IRN CHANGE FLOW

(Page 1 of 2)

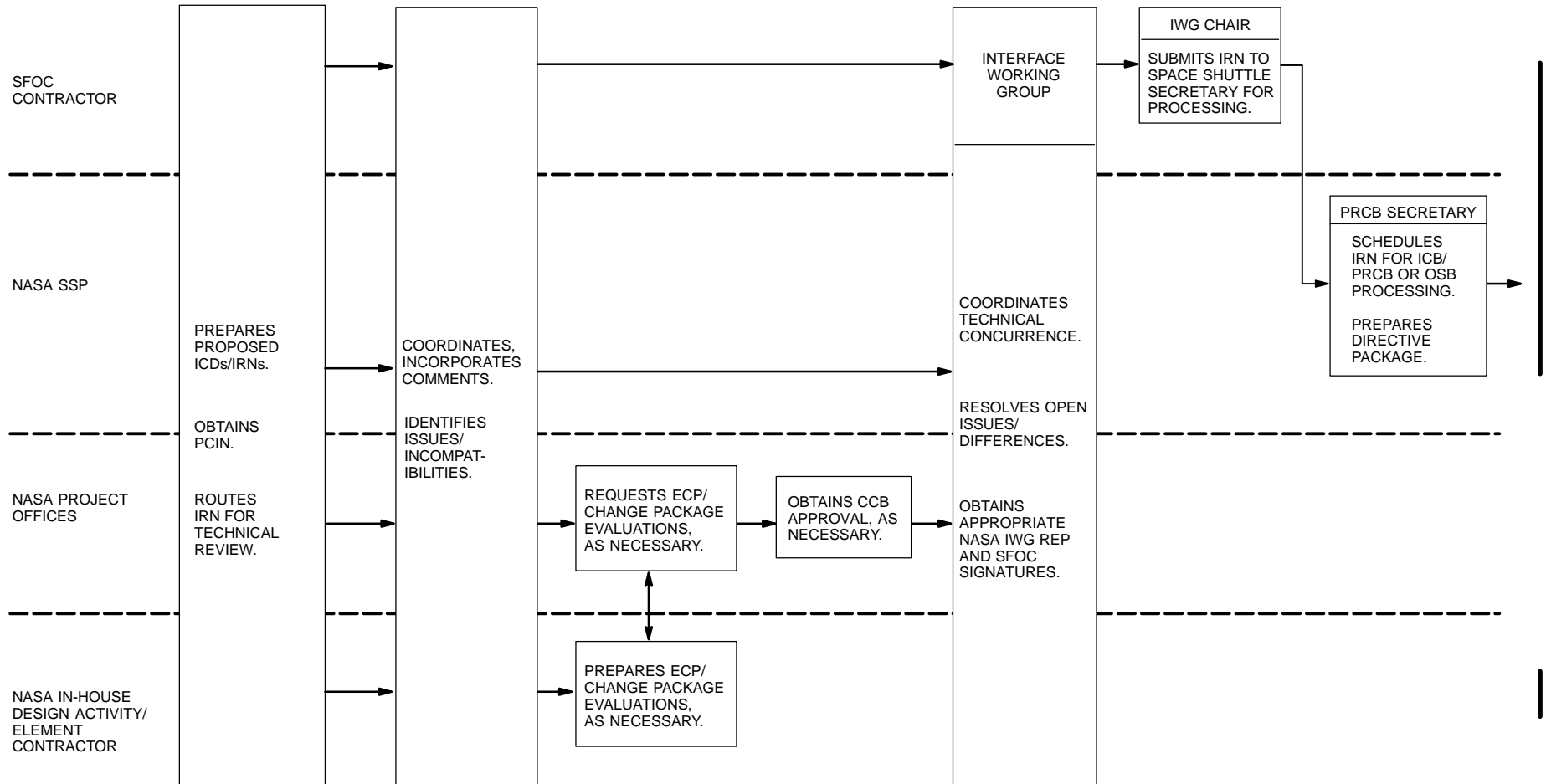


FIGURE D-1
SPACE SHUTTLE SYSTEMS ICD BASELINE AND IRN CHANGE FLOW
(Page 2 of 2)

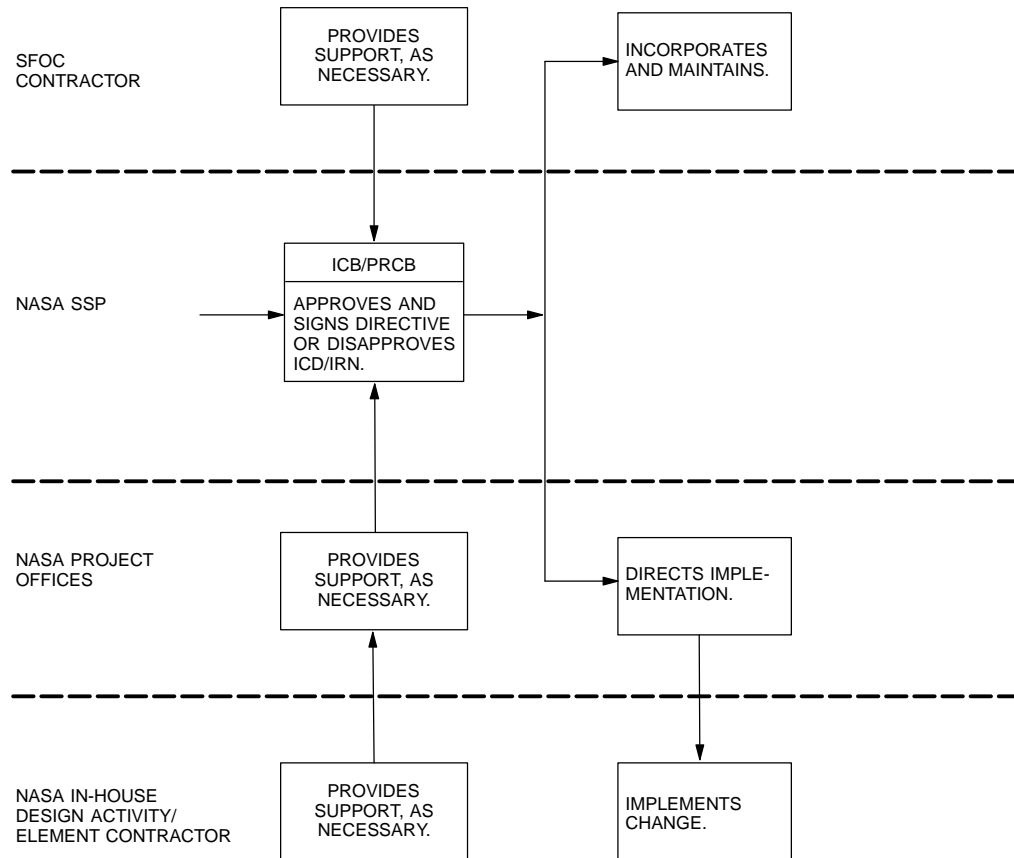


FIGURE D-2 (DELETED)

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APPENDIX E

**CONFIGURATION IDENTIFICATION AND DOCUMENT
PREPARATION REQUIREMENTS/CRITERIA**

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APPENDIX E

CONFIGURATION IDENTIFICATION AND DOCUMENT PREPARATION REQUIREMENTS/CRITERIA

1.0 PURPOSE

The purpose of this appendix is to establish uniform requirements and criteria for all elements of the Space Shuttle Program with respect to the selection, identification, and preparation of Contract/Configuration End Items (CEIs) specifications, drawings and associated lists.

2.0 SCOPE

Requirements specified within this appendix are those considered as a minimum for CM and preparation of engineering documents. Element contractors identification systems/practices may contain additional requirements.

3.0 RESPONSIBILITY AND AUTHORITY

Each SSP project office is responsible to ensure that element contractors on their projects have approved and validated document identification and preparation systems. The SFOC Contractor has the responsibility to support the project offices by identifying any deviation from these requirements that are uncovered during the coordination/evaluation of system level changes.

4.0 CONTRACT/CONFIGURATION END ITEM (CEI)

CEIs are deliverable equipment or facilities which are formally accepted by the procuring agency on an approved form.

4.1 CEI SELECTION

CEI is a designation applied to an aggregation of hardware/software, or any of its discrete portions, which satisfies an end use function and is designated by NASA for CM, and are deliverable and formally accepted on a DD Form 250 or equivalent. CEIs are line items in the contract.

4.2 CEI IDENTIFICATION

CEIs shall be identified by a permanent alphanumeric designator not exceeding nine digits assigned to identify all units comprising one CEI family (type-model-series).

The CEI identification (designation) shall be assigned by the NASA in-house design activity/contractor at the time the document identification number of the CEI specification is assigned or the first production drawing of the CEI is released, whichever occurs first.

4.2.1 Type-Model-Series

This designation constitutes a block of one or more deliverable CEI units to which the following apply:

- a. The type-model-series shall be a line item requirement in the contract.
- b. All units shall be designed to and controlled by one CEI detail specification.
- c. All units shall be identified and documented by one top drawing and a subordinate structure of installation, subassembly, and detail drawings.
- d. Within this basic drawing structure, configuration differences in production between units shall be identified and documented by adding, limiting, or both, the design application of parts and assemblies comprising the affected units.
- e. Each unit shall be formally accepted by the procuring agency and accountability transferred by means of a receiving and inspection report, DD Form 250 or equivalent.
- f. The type-model-series shall be the foundation for provisioning spares (by the contractor or the procuring agency) and for the preparation of operating and maintenance manuals for the CEI type-model-series.

4.2.2 CEI Designation Elements

The CEI designation shall consist of a basic number for the type-model-series followed by an alpha code for the series where required.

4.2.2.1 Basic Number

The basic number shall be comprised of six characters and may be a combination of letters, Arabic numbers, and dashes (-). It shall precede, but not be separated from the "series" code. Once assigned to a CEI contractually authorized by the procuring agency, this portion of the CEI number shall not thereafter be assigned to another CEI type and model.

4.2.3 Series Designation

The last character of the CEI number shall be the letter "A".

Once assigned, this letter shall be the permanent series designation for all CEIs comprising the type-model-series, including follow-on procurement within that series.

4.2.3.1 Series Designation Change

A new series designation (B, C, etc.) for the same CEI basic number shall be assigned only when contractually authorized by the procuring agency wherein all of the following apply:

- a. The new series is specified by a new CEI specification, or specification addendum.
- b. All units in the new series are identified by a new top drawing. The existing subordinate structure of installation, subassembly, and detail drawings may be made applicable as required to the new series by a common release which shows design application for both series.
- c. A new basis for acceptance, provisioning operations and maintenance is established.

4.3 CEI SERIALIZATION

CEI serial numbers are assigned for CM purposes to:

- a. Identify individual units within a family of CEIs.
- b. Establish this identity as the specific address for all contractual and management actions.
- c. Establish this address to be the same as the effectivity (usage) of engineering design and engineering changes which result from contractual and management actions.
- d. Relate the specific part number configuration of each CEI to its engineering effectivity so it will be built, allocated, and changed in accordance with required design.

4.3.1 Assigning CEI Serial Numbers

These numbers shall be assigned in an unbroken numerical progression within one CEI type-model-series beginning with "1". For computer and standardization purposes, the numbering may be signified by a three-position number (e.g., 001, 002, 003, etc.).

4.3.2 Engineering Design Effectivity Designation

The CEI number and serial number shall denote the engineering effectivity of design. This CEI number and serial number shall be affixed to each CEI unit manufactured and allocated in accordance with this engineering effectivity and design.

5.0 SPECIFICATIONS

These are documents intended for use in procurement, which clearly and accurately describe the essential and technical requirements for items, materials, or services including the procedures by which it will be determined that the requirements have been met.

5.1 SPECIFICATION IDENTIFICATION NUMBERS

The NASA in-house design activity/contractor shall assign these numbers to identify all specifications and standards required to control design of systems/equipments to be formally accepted by the procuring agency.

5.1.1 Composition of Identification Numbers

All NASA in-house design activity/contractor prepared specifications shall not exceed a total of 15 characters for the document's identification. This identification shall consist of the basic document number and a revision suffix code. The NASA in-house design activity/contractor shall assign a unique identification number to each specification document prepared.

5.1.1.1 Specification Basic Number

The basic number portion of the document identification number may include combinations of Arabic numerals, letters, and dashes (-). It shall precede, but not be separated from the revision suffix code. Once assigned to an approved specification, it shall not thereafter be changed or reassigned to another specification. New basic and document identification numbers shall be assigned for addendum specifications.

5.1.2 Government or Industry Identification Numbers

Government or industry specifications and standards shall be identified by the number assigned by the government agency or industry association to the applicable specification or standard. They shall not be reidentified by the NASA in-house design activity/contractor unless altered to suit his peculiar design requirements.

5.1.3 SCN Numbers

NASA in-house design activity/contractor and other NASA prepared specifications excluding those identified in Paragraph 5.2.3.5 are changed by approved SCNs. These SCNs shall be identified by a number that complies with all of the following:

- a. One SCN number shall be assigned to each SCN and be the common identifier for all pages/sheets of the SCN.

- b. One SCN shall be prepared to cover all changes proposed to be made to a single approved specification and shall be submitted by an ECP or equivalent for approval by NASA.
- c. SCN numbers shall be assigned in an unbroken numerical progression for each specification, beginning with "1" for the first SCN prepared. For computer purposes, the numerals may be preceded by "zeros", dependent upon the number of character positions desired.
- d. Once the SCN number has been assigned to an SCN and submitted to the SSP for approval, it shall not be changed or reassigned to another SCN within the same specification, even though the original SCN is canceled or subsequently disapproved.
- e. SCN numerical progression shall not begin anew when a revision to a specification occurs.
- f. When it is necessary to revise and resubmit an SCN, the same basic SCN number is retained and an applicable revision suffix is added after this number without any separation dash (-) on the new SCN. A new date entry also must be included.
- g. SCN revision suffixes shall be assigned in sequential order and may either be R1, R2, R3, etc., or A, B, C, etc. However, there shall not be a mixture of these suffixes within any one specification SCN numbering series.

5.1.4 Specification Revision Identification

The document identification number portion of a specification number is a permanently assigned nonduplicated number which identifies a specification. No revision letters or SCN numbers shall be assigned as a suffix to this number for coordination drafts prior to formal approval by the procuring agency.

5.1.4.1 Changes to Specification Numbers

The revision letter "A" suffix shall be assigned to the first issue of a specification formally approved by the procuring agency, even when it is identical to the coordination copy. Subsequent revision letter suffixes (B, C, D, etc.) shall be assigned only when directed by the procuring agency.

5.2 SPECIFICATION PREPARATION

Specifications shall be prepared in accordance with the requirements and criteria specified herein and in NASA in-house design activity/contractor IRDs.

5.2.1 Form and Format

All specifications deliverable to the procuring agency require rigid major paragraph numbering and title control, unless less stringent requirements defined in IRDs have been approved. Limited format control for specifications shall be exercised to the extent specified by this paragraph and its subparagraphs. Major paragraphs shall be numbered and titled as follows:

1.0	SCOPE	(Section 1)
2.0	APPLICABLE DOCUMENTS	(Section 2)
3.0	REQUIREMENTS	(Section 3)
4.0	VERIFICATION	(Section 4)
5.0	PREPARATION FOR DELIVERY	(Section 5)
6.0	NOTES	(Section 6)
10.0	APPENDIX	(Section 10)

5.2.1.1 Major Paragraphs Content

Unless the NASA in-house design activity/contractor is contractually bound to the requirements of MM 8040.12, Standard Contractor Configuration Management Requirements; and MIL-STD-490, Specification Practices; the specifications should be used as a guide for information and data to be contained within major paragraphs. Where no information is pertinent, state "This section is not applicable to this specification."

5.2.1.2 Subdivision of Major Paragraphs

Major paragraphs/sections should be broken down into as many paragraphs and subparagraphs as are required to clearly define the requirements.

5.2.1.3 Paragraph Numbering

Each paragraph and subparagraph shall be numbered consecutively within each major paragraph/section of the specification, using a period to separate the number representing each breakdown. An example is shown below:

REQUIREMENTS	3.0
First paragraph	3.1
First subparagraph	3.1.1
Second paragraph	3.2
etc.	

Itemization within a paragraph or subparagraph shall be identified by lower case letters.

5.2.1.4 Paragraph Identification/Title

Where practicable, all paragraphs and subparagraphs should be given a subject identification. It is not mandatory to use the same numbers and subject identifications for paragraphs and subparagraphs as shown in MIL-STD-490 or MM 8040.12 under major paragraphs/sections. All subject identifications for major paragraphs, breakdown paragraphs, and subparagraphs shall be underlined.

5.2.2 Title Page

The minimum data elements that shall be shown on the title page for CEI specifications are as follows:

- a. Specification number and revision letter
- b. Date released
- c. Type of specification
- d. Title/nomenclature for the specification
- e. Approved program/project nomenclature identity
- f. CEI number (as applicable)
- g. Part I or Part II (as applicable for a two-part specification)
- h. NASA in-house design activity/manufacturer's code ID number
- i. Preparing activity approval signature and date
- j. Space Shuttle Program approval signature and date
- k. Contract number as applicable

Exhibit II of MM 8040.12 may be used as a guide for location and arrangement of these data elements.

5.2.2.1 Title Pages of Non-CEI Specifications

NASA in-house design activity/contractor prepared specifications below the CEI level may be to any format. For program/project consistency, the following data elements of Paragraph 5.2.2 shall be required in addition to the NASA in-house design activity/contractor's name and address:

- a. 5.2.2a
- b. 5.2.2b

- c. 5.2.2c
- d. 5.2.2d
- e. 5.2.2h
- f. 5.2.2i

5.2.3 Specification Types and Parts

Specifications shall be prepared as one-part or two-part specifications as noted.

5.2.3.1 System Specification

The Flight and Ground System Specification shall be a one-part specification. It shall be prepared in accordance with the intent of MIL-STD-490, Appendix I (Type A specification) as modified for use on the SSP, and including the exceptions noted in Paragraph 5.2.1 and subparagraphs.

5.2.3.2 Hardware CEI Specifications

These specifications shall normally be prepared as two-part specifications. Preparation shall be in accordance with the intent of MIL-STD-490 and applicable appendices, or where contractually required, with MM 8040.12 and applicable appendices, except as noted in Paragraph 5.2.1 and subparagraphs. General or one-part specifications may be utilized where the NASA in-house design activity/contractor can justify a program cost savings and these deviations are approved and preparation criteria is defined in the applicable IRD.

5.2.3.3 Facility Specifications

These specifications shall be prepared as two-part specifications. The Part I, Detail CEI Facility Specification, shall be prepared by the Space Shuttle element contractor in accordance with the intent of MIL-STD-490, Appendix V (Type B4), or where contractually required, with MM 8040.12, Exhibit II and Appendix III, with exceptions as noted in Paragraph 5.2.1 and subparagraphs. The Part II of the specification covering the acquisition procedures and facility construction shall be prepared by Architectural and Engineering (A&E) activities in accordance with standard A&E practices.

5.2.3.4 Computer CEI Specifications

These specifications shall be prepared as two-part specifications. Preparation shall be in accordance with the intent of MIL-STD-490, Appendices VI and XIII (Types B5 and C5), or where contractually required, MM 8040.12, Exhibit II and Appendix VI, except as

noted in Paragraph 5.2.1 and subparagraphs. Deviations may be granted to use MIL-STD-483 (Configuration Management Practices for Systems, Equipment, Munitions, and Computer Programs), Appendix VI, where the NASA in-house design activity/contractor can show just cause and savings, and defines preparation criteria in his applicable IRDs.

5.2.3.5 Identification and Requirement Item Specifications

Identification Item (Non-Complex) Specifications shall be prepared as two-part specifications while Requirement Item (Inventory) Specifications shall be prepared as one-part specifications. Preparation of these specifications shall be in accordance with the intent of MIL-STD-490, Appendices IV, XI, and XII as applicable (Types B3, C3, and C4 respectively), or where contractually required, MM 8040.12, Exhibit II and applicable Appendices IV or V, except as noted in Paragraph 5.2.1 and subparagraphs.

5.2.3.6 NASA In-House Design Activity/Contractor “Company” Specifications

These are material, processing, testing, and procurement from subcontractor/supplier specifications. They may be to the design activity/contractors own format and generally are one-part specifications, but two-part specifications similar to CEI specifications (see Paragraphs 5.2.3.2 and 5.2.3.4) should be used for procurement specifications.

5.2.3.7 GSE Station Set Specifications

GSE Station Set Specifications shall be prepared in accordance with the intent of MIL-STD-490 for style and format. These specifications document the functions of the station set GSE and translates these functions into GSE requirements. These specifications establish the GSE station set performance requirements from which the station set validation test requirements are derived.

NOTE: GSE Station Set Specifications are prepared by Boeing Reusable Space Systems for other than KSC stations.

5.2.3.8 (Deleted)

6.0 DRAWINGS AND PART NUMBERS

The term “drawings” as used herein includes drawings, associated lists, and ICDs. A drawing and part number shall be assigned in accordance with DOD-STD-100D, Engineering Drawing Practices, by the NASA in-house design activity/contractor to identify in common all parts and assemblies that are interchangeable in all applications where used. Technical judgment of interchangeability is an engineering responsibility during evaluation of a change. Part numbers shall control the fabrication, assembly, and

replacement of all items/parts at all levels, including the CEI itself, except for ICDs. The ICD shall not be used to fabricate and/or procure items, and only requires a drawing/document number.

Deviations/Waivers 9 and 101 are applicable to Paragraph 6.0.
Refer to Book 2, Configuration Deviations/Waivers.

6.1 DRAWING STANDARDS

Drawings shall be prepared in accordance with DOD-D-1000B, Drawing, Engineering, and Associated Lists, and DOD-STD-100D, for the respective forms and categories, and the deviations delineated herein. The drawings of all forms and categories shall be identified by the NASA in-house design activity/contractor code identification and drawing numbers.

6.1.1 Flight Items and Non-Flight Critical Items

Drawings and associated lists shall be prepared in accordance with the requirements for Form 1 or Form 2, Category E (Procurement of Identical Items) of MIL-D-1000 or MIL-D-1000B, Drawing, Engineering, and Associated Lists, except that drawings for GSE may be prepared in accordance with DOD-D-1000B, Level 2.

6.1.2 Drawings Not Required

Drawings will not be required under the following circumstances:

6.1.2.1 Existing Standards

Engineering drawings shall not be prepared nor submitted when a government or nationally recognized industry association specification or standard/drawing satisfies the requirement. A notation on higher level drawings will indicate such items with reference to the standard.

6.1.2.2 Common Nonreparable Items

Drawings are not required for nonreparable common commercially available items such as hinges, locks, light bulbs, nuts, bolts, screws, etc., when these items are used exactly as produced by the manufacturer and are described on the assembly sources. When these items are not described in this manner on the assembly drawing, or the item does not have a separate and distinct part number in a commercial catalogue, the item will be referenced on the assembly drawing and a specification control drawing shall be prepared for the item per DOD-STD-100D.

6.1.3 Interface Control Drawings/Documents

ICDs shall be prepared in accordance with DOD-D-1000B, Form 1, or Form 2, Category B. The intent of DOD-STD-100D requirements shall be applicable except as specified

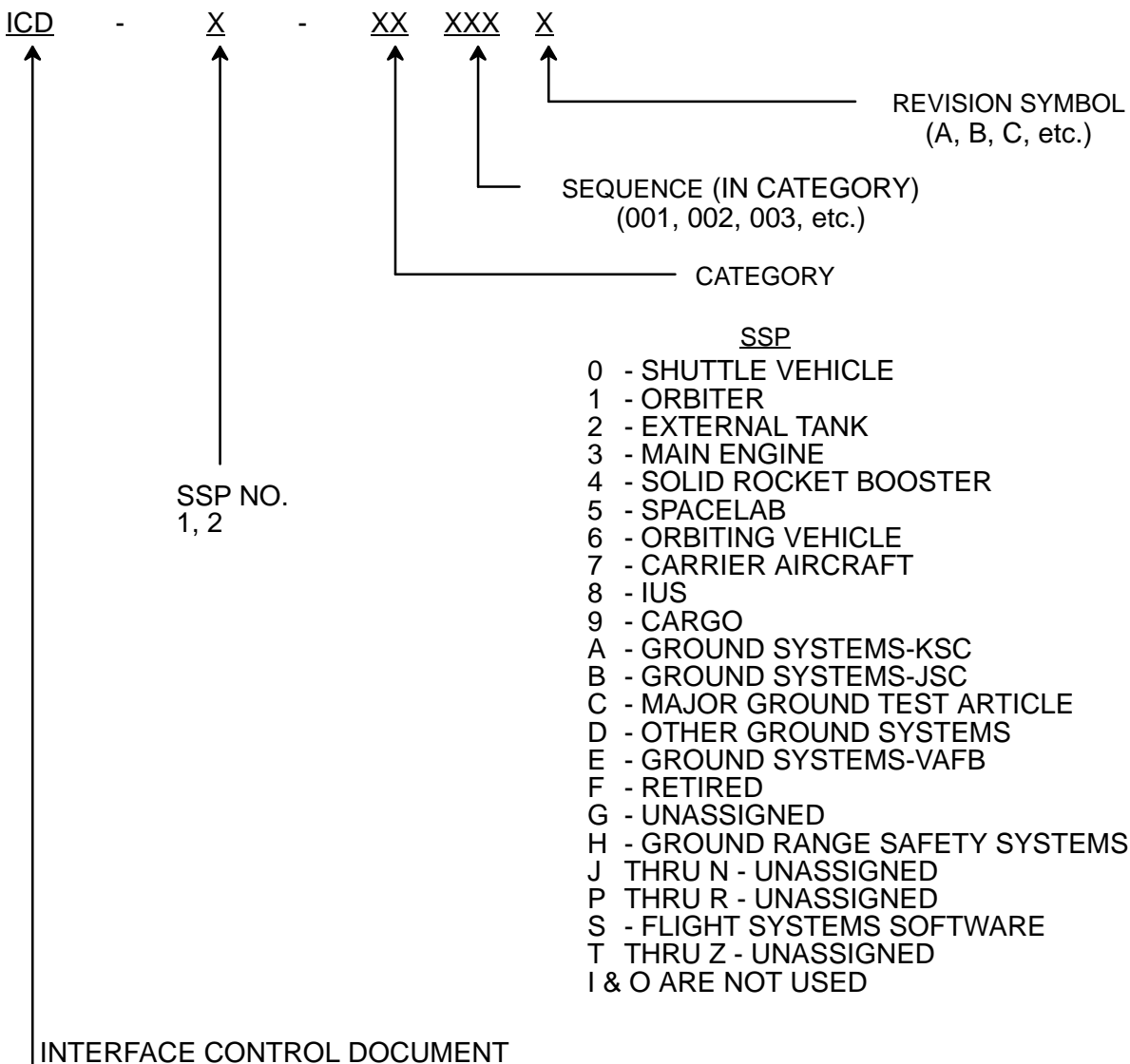
in Paragraphs 6.1.4 through 6.1.7, and the use of IRNs for proposing and recording of approved changes to ICDs (refer to Paragraph 3.1.8, its subparagraphs, and Appendix D for additional requirements). For SAIL ICD Addenda, these Addenda shall be prepared and maintained as separate documents. To minimize SAIL ICD Addenda redundant documentation, the interfaces shall be described as identical to the interfaces depicted in the basic ICD, except as noted.

6.1.3.1 Interface Revision Notice

The IRN shall be prepared in accordance with the format and instructions of JSC Form 69.

6.1.3.2 ICD Numbering

The ICD number shall consist of three segments separated by dashes (-). Alpha and Arabic numeral characters shall be used within the number segments as shown in the following diagram:



FOR EXAMPLE: ICD EXTERNAL TANK/GROUND SYSTEMS - KSC,
1st Revision

ICD-2-2A001

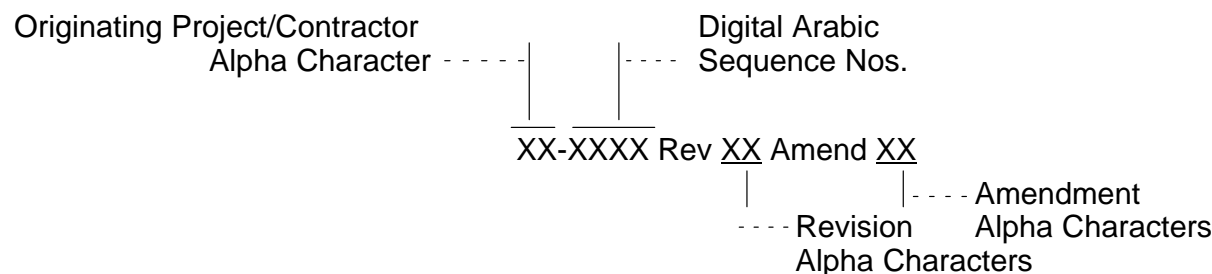
6.1.3.3 SAIL ICD Addenda

Each SAIL ICD Addenda shall be identified with the related ICD number followed by "SAIL". The title of each addendum shall be the same as that of the related ICD, followed by "SAIL ICD ADDENDUM".

6.1.3.4 Systems ICD/IRN Numbering

The IRN number shall be an identification number composed and assigned by the NASA Technical Document Management System 2 (TDMS 2). It shall consist of two

segments separated by a dash(-) as shown below. The first two (2) alpha characters represent the originating project/contractor which is submitting the IRN, the middle four (4) arabic numbers represent the IRN sequence number which is automatically assigned by the TDMS 2 system. Following the sequence number, the revision and ammendment level of the IRN will be represented by two (2) alpha characters respectively.



Originating Project/Contractor

- BC - Booster Motor Contractor
- BI - USBI (Booster Integration Contractor)
- BO - Booster NASA Office
- EC - Main Engine Contractor
- EO - Main Engine NASA Office
- IC - SFOC Contractor/B-RSS
- IO - Integration NASA Office
- KC - Kennedy Facilities Contractor
- KO - Kennedy NASA Office
- RO - Orbiter NASA Office
- TC - Tank Contractor
- TO - Tank NASA Office

IRN numbering will be assigned independently of the ICD for which it is drawn.

6.1.3.5 SAIL IRN Numbering

SAIL ICD Addenda IRNs shall be numbered in an unbroken numerical progression for each addendum, beginning with 5001 for the first IRN. This progression shall not begin anew when a revision to the addendum occurs.

6.1.4 Legibility

Drawings and reprints shall be of sufficient clarity such that every line, number, letter, and character data is clearly legible and readable. Any original microfilming, performed for the purposes of providing permanent records, shall be in general accordance with

the objectives of NHB 1440.4A, Specifications and Standards for NASA Engineering Data Microreproduction Systems, for Type 1, Class 1 microfilm.

6.1.5 Quality Assurance

The quality assurance requirements and provisions applicable to drawings shall be in accordance with those stated in DOD-D-1000B, except that the referenced document shall be NSTS 5300.4(1D-2) in lieu of MIL-Q-9858A, Quality Program Requirements.

6.1.6 Delivery Requirements

The delivery requirements for drawings shall be as specified in NSTS 07700, Volume V, as further specified by the respective project manager in appropriate information delivery schedules.

6.1.7 Drawing Practices

Drawings shall be prepared using the drawing practices requirements of DOD-STD-100D, specified in DOD-D-1000B, with the conditions and exceptions delineated by the respective project manager.

7.0 DOCUMENT MAINTENANCE

NASA in-house design activity/contractor prepared specifications, drawings, and associated lists developed in compliance with this appendix shall be kept in a current, up-to-date status, except for ground systems documentation that is not required to define the physical or functional capability to support the vehicle and, with agreement of the operational using organizations, is designated as non-maintained.

7.1 SPECIFICATIONS

Specifications shall be changed by SCNs or by update and reissue of the specification identified by a revision suffix letter (reference Paragraphs 5.1.3 and 5.1.4). NASA in-house design activity/contractor "company specifications" (see Paragraph 5.2.3.6) may be changed in accordance with individual operating procedures as approved in applicable IRDs.

7.1.1 Specification Change Notice Preparation

SCNs shall be prepared on the NASA in-house design activity/contractor's format, showing the "is" and "was" conditions for the proposed change, and submitted for NASA approval on a proposed SCN.

Approved SCNs shall be incorporated into the applicable document and forwarded to the document holders by means of new or revised pages. The new pages and the

revised pages shall provide suitable annotations to identify the revised portions and shall also show date of issue or revision. Complete SCN format and preparation instructions shall be provided in NASA in-house design activity/contractor IRDs. MIL-STD-490 or MM 8040.12, Exhibit II, where that document is a contractual requirement, may be used as a guide. Refer to Paragraph 5.1.3 for SCN numbering requirements.

7.1.2 Specification Revision

A specification revision, when authorized by the procuring agency after baselining, shall incorporate all revised pages and outstanding approved SCNs identified on the Specification Change Log (SCL). All pages of the revised specification shall reflect the latest revision letter.

7.1.2.1 Specification Change Log

The SCL shall be used with all CEI specifications to record formally the authorized SCNs to an approved revision of the specification. In addition to identifying the authorized SCNs, the SCL also serves as a continuation of the Configuration Chart. A current SCL shall be prepared and serve as the cover sheet for SCNs submitted for procuring agency approval and for distribution of authorized revised pages. The revised and updated SCL shall be included in all revised specifications and located immediately in front of the Configuration Chart. SCL preparation instructions shall be provided in NASA in-house design activity/contractor IRDs. MM 8040.12 may be used as a guide for format and data elements to be shown.

7.1.2.2 Specification Configuration Chart (SCC)

The SCC shall be used with all CEI specifications to provide a summary record that identifies the authorized ECPs and SCNs that have been incorporated into the specification through a revision. This chart shall not be updated by the NASA in-house design activity/contractor except when such specification revisions are authorized by the procuring agency. The SCC shall be located in revised specifications immediately in front of the "SCOPE" section each time a specification revision is submitted. SCC preparation instructions shall be provided in NASA in-house design activity/contractor IRDs. MM 8040.12 may be used as a guide for format and data elements to be shown.

7.2 DRAWINGS

All engineering interface control, production, and construction drawings supporting CEI design and specification requirements shall contain a revision block in accordance with the format of DOD-STD-100D. Drawings may be changed by direct revisions or ancillary document (e.g., engineering order, or engineering/drawing change notice).

7.2.1 Revision Block

Drawing revision blocks shall record all changes made to the drawing per the requirements in the applicable section of DOD-STD-100D. Where a NASA in-house design activity/contractor's standard practice conflicts with any of these requirements, deviations must be approved by the procuring agency and the practices defined by IRD.

7.2.1.1 Revision Letter

Revision letters shown in the revision block on drawings shall be assigned in accordance with the applicable section of DOD-STD-100D. There may be more than one classified change for each revision letter as all outstanding approved changes on ancillary documents shall be incorporated at the time of drawing revision under one revision letter.

7.2.1.2 Revision Description

The description portion of the revision block shall provide a brief but clear description of all changes made to the drawing under each revision letter. It shall also include the change identification number (e.g., PCIN, ECP, ECR, MCR, etc.).

7.2.2 Systems ICD Changes and Revisions

Systems ICDs shall be changed by IRNs and updated by revisions to include incorporated IRNs in accordance with the requirements and change processing procedures defined in Paragraph 3.1.8 and Appendix D of this document.

7.3 ASSOCIATED LISTS

Associated lists shall be prepared in accordance with the requirements in the applicable section of DOD-STD-100D. Where options are provided, the NASA in-house design activity/contractor may select those which are best suited to the methods and procedures of operation being employed.

7.4 SCHEMATIC SYMBOL STANDARDS

Graphic symbols needed for use in the preparation of schematic diagrams shall be those referenced in DOD-STD-100D plus the following three standards:

- a. USAS X3.5 - 1970 Flowchart Symbols and their Usage in Information Processing
- b. USAS Y32.10 - 1970 Graphic Symbols for Fluid Power Diagrams
- c. USAS Y14.17 - 1966 Fluid Power Diagrams

APPENDIX F

SHUTTLE PROGRAM

BASELINE DOCUMENT INDEX

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APPENDIX F

SHUTTLE PROGRAM BASELINE DOCUMENT INDEX

1.0 PURPOSE

The purpose of this appendix is to establish the detailed PRCB baseline control authority and delegations for approval of SSP documents as shown in Table F.1.

2.0 SCOPE

Table F.1 is the authoritative source for both the SSP controlled baseline requirements and the delegation of the configuration control of these documents from the PRCB. Table F.1 applies to all documents which establish requirements for the Shuttle Program. This includes both development and operations activities. If conflicts exist between NSTS 07700, Volume IV - Book 1 and other volumes of NSTS 07700 then NSTS Volume IV - Book 1 will take precedence.

3.0 RESPONSIBILITY

The Space Shuttle Management Integration Office is responsible for the maintenance of Table F.1. The program elements/projects shall identify their processes contained in these documents to the program manager. The owner for each process shall annually review their process for changes to ensure the process is controlled. The results of these reviews shall be documented in a quality record.

4.0 TABLE F.1 CONTENT

This table contains the "Document Number", in alphanumeric order; the "Document Title"; the "Office of Primary Responsibility" (OPR), and the "Change Control Authority". The "Change Control Authority" identifies the control board which baselines or controls changes to the document and the reference in program documentation which details the delegation of the baseline/change control authority.

In some cases, notes are placed in the "Control Board" column when there are exceptions or further details to the configuration management delegation. These exceptions or further details are detailed in the paragraph noted under the "Authority" column.

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TABLE F.1
SHUTTLE BASELINE DOCUMENT INDEX

				CHANGE CONTROL AUTHORITY	
DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CONTROL BOARD	AUTHORITY
NSTS 07700, Vol I	Program Description and Requirements Baseline	MG		PRCB	
NSTS 07700, Vol II - Bk 2	Program Structure and Responsibilities, Space Shuttle Program Directives	MG		PRCB	
NSTS 07700, Vol II - Bk 3	Program Structure and Responsibilities, Space Shuttle Program Interface Agreements	MG		PRCB	
NSTS 07700, Vol III	Flight Definition and Requirements Directive	MT	MT, Flight Manager	PRCB/ICB with Exceptions	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1e
NSTS 07700, Vol IV - Bk 1	Configuration Management Requirements, Book 1, Requirements	MG		PRCB	
NSTS 07700, Vol IV - Bk 2	Configuration Management Requirements, Book 2, Configuration Deviations/Waivers	MG		PRCB	
NSTS 07700, Vol V	Information Management Requirements	MG		PRCB	
NSTS 07700, Vol VI	Flight Support Equipment (FSE) Management	MV		PRCB	
NSTS 07700, Vol VIII	Operations	MK		PRCB	
NSTS 07700, Vol IX	Ground Systems Integration and Operations	MK-SIO		PRCB	
NSTS 07700, Vol X	Flight and Ground System Specification	MS		PRCB	
NSTS 07700, Vol X - Bk 1	Flight and Ground System, Requirements (Sections 1.0 - 6.0)	MS		PRCB	
NSTS 07700, Vol X - Bk 2	Flight and Ground System Specification, Book 2, Environment Design, Weight and Performance, and Avionics Events (Appendix 10.3 - 10.16)	MS		PRCB	
NSTS 07700, Vol X - Bk 3	Flight and Ground System Specification, Book 3, Requirements for Runways and Navigation Aids (Appendix 10.17)	MT		PRCB	
NSTS 07700, Vol X - Bk 4	Flight and Ground System Specification, Book 4, Active Deviations/Waivers	MS		PRCB	
NSTS 07700, Vol X - Bk 6	Flight and Ground System Specification, Book 6, Retired Deviations/Waivers (Appendix 10.1)	MS		PRCB	

TABLE F.1

SHUTTLE BASELINE DOCUMENT INDEX - Continued

DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
				CONTROL BOARD	AUTHORITY
NSTS 07700, Vol XI	System Integrity Assurance Program Plan	MK-SIO		PRCB	
NSTS 07700, Vol XII	Integrated Logistics Requirements	MK-SIO		PRCB	
NSTS 07700, Vol XIV	System Payload Accommodations	MT		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 07700, Vol XIV, Attachment I (Same as ICD-2-19001)	Shuttle Orbiter/Cargo Standard Interface Control Document	MS	MV/USA - USH700D	ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
NSTS 07700, Vol XIV Appendix 1	Contamination Environment	MT	Book Manager - ES	ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 07700, Vol XIV Appendix 2	Thermal	MT	Book Manager - MS	ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 07700, Vol XIV Appendix 3	Electrical Power and Avionics	MT	Book Manager - MS	ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 07700, Vol XIV Appendix 4	Structures and Mechanics	MT	Book Manager - MS	ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 07700, Vol XIV Appendix 5	Ground Operations	MT	Book Manager - KSC	ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 07700, Vol XIV Appendix 6	Mission Planning and Design	MT	Book Manager - DM2	ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 07700, Vol XIV Appendix 7	Extravehicular Activities	MT	Book Manager - XA	ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 07700, Vol XIV Appendix 8	Payload Deployment and Retrieval System	MT	Book Manager - DF4	ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1

TABLE F.1

SHUTTLE BASELINE DOCUMENT INDEX - Continued

DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
				CONTROL BOARD	AUTHORITY
NSTS 07700, Vol XIV Appendix 9	Intravehicular Activities	MT	Book Manager - SP3	ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 07700, Vol XIV Appendix 10	Integration Hardware	MT	Book Manager - MS	ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 07700, Vol XV	Resource Management Policy and Requirements	MM		PRCB	
NSTS 07700, Vol XVIII - Bk 1	Computer Systems and Software Requirements, Book 1, Allocation of Computational Functions	MV2		VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.1
NSTS 07700, Vol XVIII - Bk 2	Computer Systems and Software Requirements, Book 2, Allocation of Simulation Functions	MV2		VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.1
NSTS 07700, Vol XVIII - Bk 3	Computer Systems and Software Requirements, Book 3, Software Management and Control	MV2		VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.1
NSTS 07700-10-MVP-01	Shuttle Master Verification Plan, Volume I, General Approach and Guidelines	MS		PRCB	
NSTS 07700-10-MVP-02	Shuttle Master Verification Plan, Volume II, Combined Element Verification Plan	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 07700-10-MVP-09, Part 1	Shuttle Master Verification Plan, Volume IX, Computer Systems and Software Verification Plan, Part 1, Guidelines and Standards	MV2		VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.1
NSTS 07700-10-MVP-09, Part 2	Shuttle Master Verification Plan, Volume IX, Computer Systems and Verification Plan, Part 2, Verification Requirements	MV2		VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.1
ICD-13M15000	Space Shuttle Orbiter Vehicle/Main Engine Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-1-FDD-011	Flight Design and Dynamic Ascent Discipline, Ascent Subsystem, Day-of-Launch Function	DA		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a

TABLE F.1

SHUTTLE BASELINE DOCUMENT INDEX - Continued

				CHANGE CONTROL AUTHORITY	
DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CONTROL BOARD	AUTHORITY
ICD-2-00001	Shuttle Vehicle Mold Lines and Protuberances Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-0A001	Shuttle System/Launch Platform Stacking and Vab Servicing Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-0A002	Shuttle System Launch Pad and Platform Interfaces Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-0A003	Flight Vehicle/LPS Computational Systems Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-0A004	Space Shuttle Systems/KSC RF Communications and Tracking Checkout Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-0D003	JSC/USAF Space Shuttle/SCF RF Communications and Tracking Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-0D004	JSC/GSFC Space Shuttle RF Communications and Tracking Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-0H001	Shuttle Vehicle/Ground Range Safety System Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-12001	Orbiter Vehicle/External Tank Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-14001	Orbiter Vehicle/Solid Rocket Booster Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-17001	Orbiter/Carrier Aircraft Vehicle Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a

TABLE F.1

SHUTTLE BASELINE DOCUMENT INDEX - Continued

DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
				CONTROL BOARD	AUTHORITY
ICD-2-19001 (Same as NSTS 07700, Volume XIV, Attachment 1)	Shuttle Orbiter/Cargo Standard Interface Control Document	MS	MV/USA - USH700D	ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-1A001	Orbiter/KSC Landing Station Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-1A002	Orbiter Processing Facility/Orbiter Maintenance and Checkout Facility Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-1A003	Orbiter/Hypergolic Station Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-1D003	Orbiter Secondary Landing/Safing and Deservicing Stations Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-1D004	Orbiter and Carrier Aircraft/Mate-Demate Interfaces Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-1S001	Orbiter Primary Flight Software/Backup Flight Software Interface Control Document	MV2		SASCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.3.1
ICD-2-1S002	Flight Computer IPL Package	MV2		SASCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.3.1
ICD-2-24001	External Tank/Solid Rocket Booster Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-2A001	External Tank/Receiving, Storage and Checkout Station Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-2-4A001	Solid Rocket Booster/Receiving Processing Station Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a

TABLE F.1
SHUTTLE BASELINE DOCUMENT INDEX - Continued

DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
				CONTROL BOARD	AUTHORITY
ICD-2-4A002	Solid Rocket Booster/Retrieval Station Interface Control Document	MS		ICB Approved by MS Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-A-XXXXX Baseline (5)	Payload-specific Payload ICD Baseline Without Waiver/Deviation/Exceedance	USA- USH700D		ICB Approved by USA ICD Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-A-XXXXX Changes (5)	Payload-specific Payload ICD Changes Without Waiver/Deviation/Exceedance	USA- USH700D		ICB Approved by USA ICD Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-A-XXXXX Changes (Waiver/Deviation/Exceedance) (5)	Payload-specific Payload ICD Changes With Waiver/Deviation/Exceedance	USA- USH700D	MS2	ICB Approved by MS3 Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-A-XXXXX-OOR Baseline (6)	Shuttle Orbiter/ISS Mission ISS-XX-XX On-orbit ICD Baseline Without Waiver/Deviation/Exceedance	USA- USH700D	MS2	ICB Approved by USA ICD Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-A-XXXXX-OOR Changes (6)	Shuttle Orbiter/ISS Mission ISS-XX-XX On-orbit ICD Changes Without Waiver/Deviation/Exceedance	USA- USH700D	MS2	ICB Approved by USA ICD Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
ICD-A-XXXXX-OOR Changes (Waiver/Deviation/ Exceedance) (6)	Shuttle Orbiter/ISS Mission ISS-XX-XX On-orbit ICD Changes With Waiver/Deviation/Exceedance	USA- USH700D	MS2	ICB Approved by MS3 Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
JSC 08969	Crew Procedures Management Plan	DA		CPCB	NSTS 07700, Vol VIII, Apx. L
JSC 18206 (I, III)	Shuttle Data Integration Plan	MV2		SASCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.3.1
JSC 27891	Shuttle/Payload Configuration Management Plan for The Payload and General Support Computer (PGSC)	MV2		POCCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.4.1
JSC 28035	Program Problem Reporting and Corrective Action Requirements for Johnson Space Center Government Furnished Equipment	MV		JPRCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.5.1
JSC 28737	Program Requirements Document Integrated Propellant Transfer System (IPTS)	MV		JPRCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1g

TABLE F.1

SHUTTLE BASELINE DOCUMENT INDEX - Continued

DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
				CONTROL BOARD	AUTHORITY
NHB 1700.7A	Safety Policy and Requirements for Payloads Using the Space Transportation System	MA2		ICB Approved by MA2	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1f
NSTS 1700.7B	Safety Policy and Requirements for Payloads Using the Space Transportation System	MA2		ICB Approved by MA2	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1f
NSTS 1700.7B Addendum	Safety Policy and Requirements for Payloads Using the International Space Station (ISS Addendum)	MA2		JMICB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1f
NSTS 5300.4(1D-2)	Safety, Reliability, Maintainability and Quality Provisions for the Space Shuttle Program	MQ		PRCB	
NSTS 07636	Lightning Protection, Test and Analysis Requirements	MS		PRCB	
NSTS 08060	System Pyrotechnic Specification	MS		PRCB	
NSTS 08080-1	Manned Spacecraft Criteria and Standards	MS		PRCB	
NSTS 08110	Ground Support Equipment Integration Plan	MK-SIO		PRCB	
NSTS 08114	Requirements for Periodic Certification of Material Handling Equipment and Operating Personnel	MK-SIO		PRCB	
NSTS 08117	Requirements and Procedures for Certification of Flight Readiness	MK		PRCB	
NSTS 08123	Certification of Flexhoses and Bellows for Flow Induced Vibration	MK-SIO		PRCB	
NSTS 08126	Problem Reporting and Corrective Action (PRACA) System Requirements	NA		PRCB	
NSTS 08131	Contamination Control Plan	MS		PRCB	
NSTS 08151, Vol I	Intermediate and Depot Maintenance Requirements Document (IDMRD), Volume I, Maintenance Concepts Baseline	MK-SIO		PRCB	
NSTS 08151, Vol II	Intermediate and Depot Maintenance Requirements Document (IDMRD)	MV		VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.1
NSTS 08151, Vol III	Intermediate and Depot Maintenance Requirements Document	MV		VECB	NSTS 08151, Vol II, Para. 6.3.3
NSTS 08170	Subsystem Codes	MK-SIO		PRCB	
NSTS 08171, File I	Operations and Maintenance Requirements and Specifications Document, Introduction	MK-SIO		Special Daily PRCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1d

TABLE F.1
SHUTTLE BASELINE DOCUMENT INDEX - Continued

DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
				CONTROL BOARD	AUTHORITY
NSTS 08171, File II	Operations and Maintenance Requirements and Specifications Document, Integrated OMRSD	MK-SIO	Vol 2 - B-RSS, KSC Vol 4 - USA and KSC Vol 6 - B-RSS and KSC	Special Daily PRCB with Exceptions	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1d
NSTS 08171, File III	Operations and Maintenance Requirements and Specifications Document	MK-SIO		Special Daily PRCB with Exceptions	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1d
NSTS 08171, File IV	Operations and Maintenance Requirements and Specifications Document, External Tank	MK-SIO		Special Daily PRCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1d
NSTS 08171, File V	Operations and Maintenance Requirements and Specifications Document, Solid Rocket Booster	MK-SIO		Special Daily PRCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1d
NSTS 08171, File VI	Operations and Maintenance Requirements and Specifications Document, KSC Ground Support Equipment	MK-SIO		Special Daily PRCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1d
NSTS 08171, File VII	Operations and Maintenance Requirements and Specifications Document, Spacelab MMSC Stand Alone File	MK-SIO		Special Daily PRCB with Exceptions	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1d
NSTS 08171, File VIII	Operations and Maintenance Requirements and Specifications Document, Non-Spacelab Shuttle Payloads	MK-SIO	Vol 1 - B-RSS and KSC	Special Daily PRCB with Exceptions	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1d
NSTS 08171, File IX	Operations and Maintenance Requirements and Specifications Document, Flight Data Collections and Analysis Requirements	MK-SIO		Special Daily PRCB with Exceptions	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1d
NSTS 08171, File X	Operations and Maintenance Requirements and Specifications Document, International Space Station (ISS) OMRSD	MK-SIO		ISS Program	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1d
NSTS 08192	Math Models of Friction Characteristics for Orbiter Main and Nose Gear Tires	MV		PRCB	
NSTS 08198	Safety and Obsolescence (S&O) Vulnerability Assessment Methodology	MA		SSUPRCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.11.1

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				CHANGE CONTROL AUTHORITY	
DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CONTROL BOARD	AUTHORITY
NSTS 08203	Technical Operating Procedures (TOPs) Review Implementation Plan	MK-SIO		PRCB	
NSTS 08209, Vol I	Shuttle Systems Design Criteria, Volume I, Shuttle Performance Assessment Data Book	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 08209, Vol II	Shuttle Systems Design Criteria, Volume II, Integrated Vehicle Baseline Characterization (IVBC-3)	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 08209, Vol III	Shuttle Systems Design Criteria, Volume III, Systems and Environmental Dispersions	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 08209, Vol IV	Shuttle Systems Design Criteria, Volume IV, Generic Ascent Flight Design Requirements	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
	Critical Math Model Database	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 08209, Vol VII	Shuttle Systems Design Criteria, Volume VII, Performance Enhancement Systems Certification Summary Document	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 08218	Intercenter Photographic and Television Analysis Contingency Action Plan	MK-SIO		PRCB	
NSTS 08240	Television Plan	MT		PRCB	
NSTS 08242	Limitations for Non-Flight Materials and Equipment Used in and Around the Space Shuttle Orbiter Vehicles	MK-SIO		PRCB	

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DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
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NSTS 08244	Program Launch and Landing Photographic Engineering Evaluation	MK-SIO		PRCB	
NSTS 08271	Flight and Ground Software Verification and Validation Requirements	MV2		VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.1
NSTS 08303	Ice/Debris Inspection Criteria	MK-SIO		PRCB	
NSTS 08307	Criteria for Preloaded Bolts	ES		PRCB	
NSTS 08318	Hydraulic System Exceptions to MIL-H-5440	EA		PRCB	
NSTS 08329, Vol VI	DOLILU II Definition and Requirements Document, Volume VI, DOLILU II Quality Assurance Rules	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 08329, Vol VIII	DOLILU II Definition and Requirements Document, Volume VIII, DOLILU Operations Support Plan	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 08338, Vol I	Orbiter Avionics Mass Memory Unit Computer Program Integration Plan Release Control	MV2		SASCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.3.1

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DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
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NSTS 08338, Vol II	Orbiter Avionics Mass Memory Unit Computer Program Integration Plan Release Authority and Schedules	MV2		SASCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.3.1
NSTS 08338, Vol III	Orbiter Avionics Mass Memory Unit Computer Program Integration Plan Deliverable Requirements and Tape Formats	MV2		SASCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.3.1
NSTS 08347	Contingency Abort Data Book	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 08349	System Integration Plan for Integrated Mission Support Plan	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 08399	Space Shuttle Program (SSP) Critical Items List (CIL)	MQ		Project CCB/PRCB	NSTS 22206, Para. 5.3
NSTS 08934, Vol I	Space Shuttle Operational Data Book, Volume I, Shuttle Systems Performance and Constraints Data	MV	Affected Flight Elements	VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1f
NSTS 08934, Vol II	Space Shuttle Operational Data Book, Volume II, Mission Mass Properties	MV	Affected Flight Elements	VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1f
NSTS 08934, Vol III	Space Shuttle Operational Data Book, Volume III, Shuttle Systems Analysis Data	MV	Affected Flight Elements	VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1f
NSTS 08934, Vol IV	Space Shuttle Operational Data Book, Volume IV, Orbiter Landing Emergency Rescue Data	MV	Affected Flight Elements	VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1f
NSTS 08934, Vol V	Space Shuttle Operational Data Book, Volume V, Orbiter Flight Capability	MV	Affected Flight Elements	VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1f
NSTS 08934, Vol VI	Space Shuttle Operational Data Book, Volume VI, Orbiter Propellant Dump Reference Data	MV	Affected Flight Elements	VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1f
NSTS 08934, Vol VII	Space Shuttle Operational Data Book, Volume VII, Orbiter Ascent Structural Envelopes	MV	Affected Flight Elements	VECB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1f
NSTS 09095	Space Shuttle Systems Weight and Performance Status Report	MS		PRCB	

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DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
				CONTROL BOARD	AUTHORITY
NSTS 10658	Shuttle Avionics Integration Laboratory, SAIL/MMES Requirements Document	EV		NASA SAIL Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.3.1
NSTS 12820	STS Operational Flight Rules (Previously JSC 12820)	DA		FRCB	NSTS 07700, Vol VIII, Apx. P
NSTS/ISS 13830	Payload Safety Review and Data Submittal Requirements for Payloads Using the Space Shuttle and International Space Station	MA2		JMICB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.5.2.1
NSTS 14046	Payload Verification Requirements	MS	MT	ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 16007	Shuttle Launch Commit Criteria and Background Document	MK-SIO		Special Daily PRCB	NSTS 07700, Vol IV - Bk 1, Para. 4.4.13.6.1
NSTS 16725	Flight Tests and Supplementary Objectives Document	MT		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 16979	Shuttle Orbiter Failure Modes and Effects Associated with Standard Cargo Interfaces	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 17462 - Blank Book	Flight Requirements Document	MT		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1b
NSTS 17462 - Flight-specific Baseline - Flight-specific Changes	STS-XX Flight Requirements Document	MT		ICB Approved by Flight Manager with Exceptions as Noted in NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1b	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1b
NSTS 17462B	STS-XX Plug-in Plan for Flight Requirements Document	MT		ICB Approved by Flight Manager or FIM with Exceptions as Noted in NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1b	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1b

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DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
				CONTROL BOARD	AUTHORITY
NSTS 17462-ISS	Flight Requirements Document International Space Station (ISS) Standard	MT	MS	ICB with exceptions as noted in NSTS 07700, Vol. IV - Bk. 1, Para. 4.3.2.2.1	NSTS 07700, Vol. IV - Bk. 1, Para. 4.3.2.2.1
NSTS 17462-PRM	Flight Requirements Document ISSA Performance Reference Mission	MT	MT	PRCB	
NSTS 18798	Interpretations of NSTS/ISS Payload Safety Requirements	MA2		ICB Approved by MA2	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 21000-A01	Data Requirements for the Payload Data Package, Annex No. 1	MS		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 21000-A02	Data Requirements for the Flight Planning Annex, Annex No. 2	DA		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 21000-A04	Standard Integration Plan, Annex No. 4, Command and Data Requirements (Previously 14093)	MV2		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 21000-A05	Data Requirements for the Payload Operations Control Center Annex, MCC/JSC/POCC Remote POCC Interface Requirements	DA		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1a
NSTS 21000-A06	Data Requirements for the Orbiter Crew Compartment Annex	SP3		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1a
NSTS 21000-A07	Training Annex Data Requirements	DA/DG		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 21000-A11	Data Requirements for the Extravehicular Activity Annex	XA		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1a

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DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
				CONTROL BOARD	AUTHORITY
NSTS 21000-ICA	Standard Orbiter Crew Compartment Interface Control Annex	MS	MT/MS2/MS3	ICB Approved by MS3 Book Manager and SP3 Crew Station Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 21000-IDD-ISS	International Space Station Interface Definition Document	MS	MS2/OM/USA- USH700D	JMICB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.5.2.1c
NSTS 21000-IDD-MDK	Shuttle/Payload Interface Definition Document for Middeck Accommodations	MS	MT/SP3/MS2/USA- USH700D	PRCB Approved by MS3 Book Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
NSTS 21000-IDD-PGSC	Shuttle Payload Interface Definition Document for the Payload and General Support Computer (PGSC)	MV2	MT	Portable Onboard Computing CCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.4.1.1
NSTS 21000-IDD-SML	Shuttle/Payload Interface Definition Document for Small Payload Accommodations	MS	MT/USA-USH700D	PRCB Approved by MS3 Book Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
NSTS 21000-SIP-ATT	Shuttle/Payload Standard Integration Plan for Attached Payloads	MT		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 21000-SIP-DRP	Shuttle/Payload Standard Integration Plan for Deployable/Retrievable-Type Payloads	MT		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 21000-SIP-GAS	Shuttle/Payload Standard Integration Plan for Get Away Special Payloads	MT		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1

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DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
				CONTROL BOARD	AUTHORITY
NSTS 21000-SIP-MDK	Shuttle/Payload Standard Integration Plan for Middeck-Type Payload	MT		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 21000-SIP-MIP (ISSA)	Space Station Mission Integration Plan for the Mission (STS-XX)	MT		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1a, 4.3.5.2.1
NSTS 21000-SIP-NDD	Standard Integration Plan for Nonstandard Development Test Objective/Detailed Supplementary Objective or Risk Mitigation Experiment	MT		ICB Approved by MT	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 1 Baseline	PIP Annex 1 Payload Data Annex Payload Specific Baseline	USA-USH700D	PIM	ICB Approved by USA Annex Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 1 Changes	PIP Annex 1 Payload Specific Changes	USA-USH700D	PIM	ICB Approved by USA Annex Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 2 Baseline	PIP Annex 2 Flight Planning Payload Specific Baseline	DA	Annex Manager	ICB Approved by PIM	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 2 Changes	PIP Annex 2 Payload Specific Changes	DA	PIM	ICB Approved by Annex Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 4 Baseline	PIP Annex 4 Command and Data Payload Specific Baseline	MV2	PIM, Annex Manager	ICB Approved by MS2	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1

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DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
				CONTROL BOARD	AUTHORITY
PIP Annex 4 Changes	PIP Annex 4 Payload Specific Changes	MV2	PIM	ICB Approved by Annex Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 5 Baseline	PIP Annex 5 Payload Operations Control Center - Payload Specific Baseline	DA	Annex Manager	ICB Approved by PIM	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 5 Changes	PIP Annex 5 Payload Specific Changes	DA	PIM	ICB Approved by Annex Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 6 Baseline	PIP Annex 6 Orbiter Crew Compartment - Payload Specific Baseline	SA	PIM	ICB Approved by Annex Manger	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 6 Changes	PIP Annex 6 Payload Specific Changes	SA	PIM	ICB Approved by Annex Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 7 Baseline	PIP Annex 7 Training - Payload Specific Baseline	DA	Annex Manager	ICB Approved by PIM	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 7 Changes	PIP Annex 7 Payload Specific Changes	DA	PIM	ICB Approved by Annex Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 8 Baseline	PIP Annex 8 Launch Support Plan - Payload Specific Baseline	KSC-NN		Payload Level III Configuration Control Board	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 8 Changes	PIP Annex 8 Payload Specific Changes	KSC-NN		Payload Level III Configuration Control Board	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 11 Baseline	PIP Annex 11 EVA - Payload Specific Baseline	XA	Annex Manager. PIM	ICB Approved by XA	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
PIP Annex 11 Changes	PIP Annex 11 EVA - Payload Specific Changes	XA	PIM	ICB Approved by Annex Manager	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1

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NSTS 21075	Space Shuttle Operational Flight Design Standard Groundrules and Constraints	DA		ICB Approved by MA2	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 21111	Generic Integrated Cargo Hazard Assessment Report	USA D7003		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 21288	Required Data/Guidelines for Payload/Shuttle Electromagnetic Compatibility Analysis	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 21306	Project Management Plan for the Androgynous Peripheral Docking System and Associated Docking Targets	MV	JSC-MA2 JSC-OA	JMICB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.5.1.1
NSTS 21311	Space Shuttle Program/International Space Station Program Joint Integration Schedule (SSP/ISSP JIS)	JSC-MT3	JSC-OC JSC-OM2	JMICB	NSTS 07700, Vol II - Bk 3, SSPIA No. 39
NSTS 22206	Requirements for Preparation and Approval of Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL)	MQ		PRCB	
NSTS 22254	Methodology for Conduct of Space Shuttle Program Hazard Analyses	MQ		PRCB	
NSTS 22579	NSTS Safety, Reliability and Quality Assurance Survey Program Plan	NA		PRCB	
NSTS 22648	Guidelines for Flammability Configuration Analysis for Spacecraft Application	MS		PRCB	
JSC 28484	Program Requirements Document for JSC Non-critical Government Furnished Equipment	MV		JPRCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1g
NSTS 37308	System Integration Plan for Space Shuttle Main Engine Block II Configuration	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1

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NSTS 37310	Program Safety Risk Ranking Methodology	MA		SSUPRCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.11.1
NSTS 37326	Shuttle Crew Scheduling Constraints	DO4	MT3	ICB Approved by MT Flight-specific Exceptions Approved by Flight Manager as Noted in NSTS 07700, Vol. IV - Bk 1, Para. 4.3.2.2.1	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 37328	Mishap Investigation Team Fieldbook	MA		PRCB	
NSTS 37329	Structural Integration Analyses Responsibility Definition for Space Shuttle Vehicle and Cargo Element Developers	MS		ICB Approved by MS	NSTS 07700, Vol. IV - Bk 1, Para. 4.3.2.2.1
NSTS 37330	Bonding, Electrical, and Lightning Specifications	MS		ICB Approved by MS	NSTS 07700, Vol. IV - Bk 1, Para. 4.3.2.2.1
NSTS 37333	The Electromagnetic Compatibility Frequency Analysis Computer Program EMCFAB1	MS		ICB	NSTS 07700, Vol. IV - Bk 1, Para. 4.3.2.2.1
NSTS 37334	Electromagnetic Compatibility Frequency Analysis Computer Program Desk Instructions	MS		ICB	NSTS 07700, Vol. IV - Bk 1, Para. 4.3.2.2.1
NSTS 37337	Orbiter System Requirements Document for the Multipurpose Logistics Module (MPLM) Cooling System Modification	MV		VECB	NSTS 07700, Vol. IV - Bk 1, Para. 4.3.2.3.1
NSTS 37341	Project Management Plan for the Electric Auxiliary Power Unit (EAPU)	MV		PRCB	
NSTS 37342	Program Requirements Document Electric Auxiliary Power Unit (EAPU)	MV		PRCB	
NSTS 37343	Shuttle Element System Requirements Document for the Shuttle Cooling System Supporting Multi Purpose Logistics Module (MPLM)	MS		ICB Approved by MS	
NSTS 37344	Project Management Plan for Main Landing Gear Tire/Wheel Upgrade	MV		VECB	NSTS 07700, Vol. IV - Bk 1, Para. 4.3.2.3.1

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				CONTROL BOARD	AUTHORITY
NSTS 37345	Shuttle Environmental Assurance Initiative Program Plan	MSFC-MP		PRCB	
NSTS 37346	Project Management Plan for the Cockpit Avionics Upgrade	MV		PRCB	
NSTS 37347	Cockpit Avionics Upgrade Program Requirements Document	MV		PRCB	
NSTS 37349	Long Life Alkaline Fuel Cell (LLAFC) Project Management Plan	MV		PRCB	
NSTS 37350	System Integration Plan for Flight Operations Reinvention	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
NSTS 37351	System Requirements Document for Flight Operations Reinvention	MS		PRCB	
NSTS 37352	Program Requirements Document for Long Life Alkaline Fuel Cell	MV		PRCB	
NSTS 37358	Space Shuttle Program Process Control Management Plan	MV		PRCB	
NSTS 37364	Flight Operations Reinvention Integrated Verification Plan	MS		PRCB	
NSTS 37366	Shuttle Environmental Assurance (SEA) Initiative Implementation Plan	MSFC-MP01		PRCB	
NSTS 37367	Program Industrial Engineering for Safety Program Management Plan	KSC-MA		PRCB	
NSTS 37400	Space Shuttle Program Upgrades Management Plan	MV		PRCB	
NSTS 47000	Program Requirements Document for SSME Advanced Health Management System (AHMS) Phase I	MSFC-SSME		PRCB	
NSTS 47001	SSME Advanced Health Management System (AHMS) Project Management Plan	MSFC-SSME		PRCB	
NSTS 47004	Project Management Plan for Friction Stir Welding of External Tank Barrels	MSFC-ET		PRCB	
NSTS 47005	Program Requirements Document for Improved Main Landing Gear Tire/Wheel	MV		PRCB	
NSTS 47007	Program Requirements Document for SSME Advanced Health Management System Plan (AHMS) Phase 2	SSME		PRCB	

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NSTS 47008	Management Plan for Space Shuttle Upgrades Program Integration	MS		PRCB	
NSTS 47009	Program Requirements Document for SRB Advanced (HEAPU) TVC Subsystem	SRB		PRCB	
NSTS 47012	Program Requirements Document for Friction Stir Welding of External Tank Barrels	MSFC-ET		PRCB	
SSP 50021	International Space Station Program Safety Requirements Document	MA2		JPRCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1g
SD72-SH-0060-2	Aerodynamic Design Data Book, Volume II, Mated Vehicle	MS		PRCB	
SD73-SH-0181	Space Shuttle Aerodynamic Heating Data Book	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
SD74-SH-0082	Acoustics and Shock Data Book, Space Shuttle Systems	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
SD74-SH-0129	Space Shuttle Flutter and Aeroelasticity Data Book	MS		PRCB	
SD74-SH-0144	Space Shuttle Program Thermal Interfaces Design Data Book	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
SE-R-0006	General Specification Space Shuttle System Requirements for Materials and Processes	EA		PRCB	
SE-S-0073	Specification Fluid Procurement and Use Control	MK-SIO		PRCB	
SL-E-0001	Specification Electromagnetic Compatibility Requirement	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
SL-E-0002	Specification Electromagnetic Interference Characteristics, Requirements for Equipment, Book 1 - Existing Hardware, Book 2 - New or Modified Hardware	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
SL-T-0003	General Requirements for the Preparation of Space Shuttle Technical Manuals	MK-SIO		PRCB	
SL-T-0004	Preparation of Space Shuttle Organizational Operations and Maintenance Manuals	MK-SIO		PRCB	
SL-T-0005	Preparation of Space Shuttle Intermediate and Depot Maintenance Manuals	MK-SIO		PRCB	
SL-T-0006	Preparation of Space Shuttle Intermediate and Depot Level Maintenance Manuals (Engines)	MK-SIO		PRCB	
SL-T-0007	Preparation of Space Shuttle Illustrated Parts Breakdowns (IPBs)	MK-SIO		PRCB	

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DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
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SL-T-0008	Preparation of Space Shuttle Work Unit Code Manuals	MK-SIO		PRCB	
SL-T-0010	Preparation of Time Compliance Technical Instructions	MK-SIO		PRCB	
SL-T-0012	Preparation of Space Shuttle Nondestructive Inspection Manuals	NX		PRCB	
SL-T-0014	Preparation of Space Transportation System Mission Equipment End Item Data Packages	MK-SIO		PRCB	
SN-C-0005	Contamination Control Requirements	NT		PRCB	
SN-D-0007	Acceptance Data Package Requirements	MK-SIO		PRCB	
SN-P-0006	Printed Wiring Board Multilayer, Plated through Hole, Design Specifications for	NA		PRCB	
SN-S-0008	Software Deliverable Data Package Requirements Specification	MV2		SASCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.3.1
SP-T-0023	Specification Environmental Acceptance Testing	MS		PRCB	
SSD90D0016	Space Shuttle Generic ETR Plume Heating Data Book: External Tank	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
SSD90D0106	Space Shuttle Generic ETR Aerodynamic and Orbiter Ascent Plume Heating Data Book: External Tank Ascent	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
SSD90D0159	Space Shuttle Generic ETR Aerodynamic Heating Data Book: Solid Rocket Booster - Ascent	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
SSD90D0169	Space Shuttle Generic ETR Plume Heating Book: Solid Rocket Booster - Ascent	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
SSD96D0007	Space Shuttle Generic Certification SSME Nozzle Entry Aeroheating Data Book	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
STS84-0258	IVBC-3 External Tank Plume Heating Data Book	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
STS84-0462	Space Shuttle IVBC-3 Aerodynamic Heating Data Book - External Tank Ascent (Books I - III)	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
STS84-0615	IVBC-3 SSME (Nozzle) Plume Heating Data Book	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
STS84-0616	IVBC-3 Orbiter Plume Heating Data Book (Books I, II)	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1

TABLE F.1

SHUTTLE BASELINE DOCUMENT INDEX - Continued

DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
				CONTROL BOARD	AUTHORITY
STS84-0666	Space Shuttle IVBC-3 Aerodynamic Heating Data Book - Orbiter Ascent (Books I - III)	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
STS85-0118	Operational Aerodynamics Design Data Book, Volumes I - V	MS		PRCB	
STS85-0169-1	Structural Design Loads Data Book, Baseline Vehicle Design Criteria and Missions	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
STS85-0169-2	Structural Design Loads Data Book, Orbiter Structural Loads	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
STS85-0169-3	Structural Design Loads Data Book, External Tank Structural Loads	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
STS85-0169-4	Structural Design Loads Data Book, Solid Rocket Boosters Structural Loads	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
STS85-0169-6	Structural Fatigue Loads Spectra Data Book	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
STS85-0169-7	Structural Design Loads Data Book, Ground to Flight System Interface Excursion Data	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
STS85-0169-8	Structural Design Loads Data Book, KSC Mobile Launch Platform Structural Loads	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
STS85-0462	Space Shuttle IVBC-3 SSME Entry Aeroheating Data Book	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
STS90-D0336	Space Shuttle Generic ETR Aerodynamic Heating Data Book, External Tank - Ascent	MS		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
SW-E-0002	Ground Support Equipment General Design Requirements, Book 1, Existing GSE, Book 2, New GSE	MK-SIO		PRCB	
	Integration Plans Flight Specific Baseline - Carrier Integration Plans (CIPs) - Integration Plans (IPs) - Payload Integration Plans (PIPs) - Mission Integration Plans (MIPs)	MT		ICB Approved by PIM (2)	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1

TABLE F.1
SHUTTLE BASELINE DOCUMENT INDEX - Continued

DOCUMENT NUMBER	DOCUMENT TITLE	OPR	CONCURRENCE	CHANGE CONTROL AUTHORITY	
				CONTROL BOARD	AUTHORITY
	Integration Plans Flight Specific Changes - Carrier Integration Plans (CIPs) - Integration Plans (IPs) - Payload Integration Plans (PIPs) - Mission Integration Plans (MIPs)	MT		ICB Approved by MT or Flight Manager (3)	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
	Payload Requirements Documents (PRDs)	MT		ICB Approved by PIM	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1
	Payload Specific ICD Baselines and Changes	MS	MT	PRCB Approved by MS (1)	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1a
	Program Requirement Documents (PRDs)	Various		Various	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1g
	Backup Flight Software-Program Requirements Documents (PRDs)	MV2		SASCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.3.1
	Program Management Plans (PMPs)	Various		Various	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.1.1h, 4.3.2.1.1i
	Project Technical Requirements Specifications (PTRSs)	Various		Various	NSTS 07700, Vol IV - Bk 1, Para 4.3.2.1.1j
	Flight Software -Functional Subsystem Software Requirements (FSSRs)	MV2		SASCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.3.1
	Ascent Flight Design Freeze Points	USA		ICB Approved by MS	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.2.1j
	Flight Software-Computer Program Development Specifications (CPDSs)	EV		SASCB	NSTS 07700, Vol IV - Bk 1, Para. 4.3.2.3.3.1
	Trajectory Design Data Packages	USA Systems Integra- tion		USA Systems Integration Review Board	Product Development Plan for Flight Systems Analysis, Paragraph 3.2.1.7

- (1) Payload-unique PIRNs to Orbiter/payload ICDs developed from MSFC carrier IDD/ICDs will require MSFC concurrence when the PIRN content exceeds, deviates, or waives interfaces defined in the MSFC IDD/ICD.
- (2) The PIM is delegated authority to approve CRs which baseline PIPs.

TABLE F.1

SHUTTLE BASELINE DOCUMENT INDEX - Concluded

- (3) IP changes prior to FDRD baseline will be dispositioned by MT. IP changes after FDRD that will be dispositioned by MT include: Multi-flight effectivity, editorial, changes in the schedule, incorporation of approved standard words, or implementation of higher-level direction.
- (4) ICD-A-XXXXXX is generic designation for payload ICD.
- (5) ICD-A-XXXXXX-OOR is generic designation for ISS on-orbit ICD.

Legend:

CA	- Flight Crew Operations Directorate
DA	- Mission Operations Directorate
EA	- Engineering Directorate
ES	- Structures and Mechanics Division
MA2	- Space Shuttle Program Integration
MG	- Space Shuttle Management Integration Office
MM	- Space Shuttle Business Office
MS	- Space Shuttle Systems Integration Office
MS2	- Engineering Integration Office
MS3	- Project Integration Office
MT	- Space Shuttle Customer and Flight Integration Office
MT3	- Manifest and Flight Integration Office
MV	- Space Shuttle Vehicle Engineering Office
MV2	- Avionics and Software Office
MV5	- Flight Crew Equipment Management Office
MQ	- Space Shuttle SR&QA Office
NA	- Safety, Reliability, and Quality Assurance Office
ND	- Operations and Quality Assurance Division
OC	- Space Station Operations Office
OM	- Space Station Mission Integration Office (Assembly and Manifest Team)
SA	- Space and Life Sciences Directorate
XA	- Extravehicular Activity (EVA) Project Office
KSC-PH	- Shuttle Processing Directorate
MK-SIO	- Space Shuttle KSC Integration Office

APPENDIX G

CONFIGURATION MANAGEMENT AUDIT PROCEDURES
FOR PROGRAM ELEMENTS/PROJECTS

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APPENDIX G

CONFIGURATION MANAGEMENT AUDIT PROCEDURES FOR PROGRAM ELEMENTS/PROJECTS

1.0 PURPOSE

The Space Shuttle Management Integration Office, in accordance with the requirements of Paragraph 6.3, shall conduct periodic CM audits of each SSP element/project CM system. These audits will verify the adequacy of CM procedures and implementation as practiced by the program elements/projects and will identify corrective action if required.

2.0 SCOPE

This plan defines and describes the requirements, methods, procedures, and responsibilities applicable to audits of program element/project CM systems by the Space Shuttle Management Integration Office. It is directed towards the surveillance of program elements/project, and does not preclude nor usurp project or contractor authority to conduct comparable audits of subordinate elements. The CM discipline required during the entire life cycle of the program warrants periodic SSP audits to evaluate program element/project CM methods, systems, and operations. These audits will assist program management in having assurance that there is program compatibility of CM activities and that the requirements of this document are being satisfied.

3.0 RESPONSIBILITIES

- a. The Manager, Space Shuttle Program will appoint personnel, including the Chair, to a SSP audit team which will conduct audits of the program element/project CM systems. The Chair has responsibility to:
 1. Develop, approve, and distribute a detailed agenda and schedule for the conduct of each CM audit.
 2. Assign personnel appointed to the SSP audit team for each of the following major review areas:
 - (a) Organization
 - (b) Identification
 - (c) Verification
 - (d) Change control

- (e) Status and accounting
 - (f) Interface control
- 3. Arrange and conduct a preliminary meeting of the SSP audit team to include:
 - (a) Discussion of the purpose and objectives of the audit.
 - (b) A breakdown of audit review areas and assignment of individual responsibilities to the team members. Assignment to each team member of the responsibility to review audit criteria, reference data, and supporting information concerning his assigned audit review area(s). This activity shall include the compilation of specific information and detailed audit planning to be used in the performance of the audit, as required.
 - (c) An overall review of the detailed agenda and schedule for the audit prior to approval and distribution. This will include pre-audit actions and audit activities.
- 4. Conduct a pre-audit meeting, if necessary, of the team members after completion of the individual actions above and prior to formal audit notification to the individual program element/project. At this meeting, plans will be finalized concerning the pending audit. All pertinent data which may significantly affect schedule, areas of the audit, facilities, personnel, etc., shall be presented at this meeting for discussion and resolution or decision.
- b. The audited organization (program element/project) shall:
 - 1. Make arrangements for the SSP audit team (space, telephones, typing assistance, etc.). Identify appropriate point(s) of contact.
 - 2. Implement closeout action.
 - 3. Provide monthly reports to the SSP audit team Chair until final closeout has been achieved.

4.0 PROCEDURE

- a. A SSP CM audit will be scheduled for the following program elements/projects and the system contractor as deemed necessary by the SSP.
 - 1. Orbiter - JSC
 - 2. SSME - MSFC

3. ET - MSFC
4. SRB - MSFC
5. (Deleted)
6. RSRM - MSFC
7. Launch and Landing - KSC
8. Shuttle Carrier Aircraft - JSC
9. Shuttle Training Aircraft - JSC
10. Boeing Reusable Space Systems - Huntington Beach
11. Shuttle Projects Office - MSFC
12. Flight Support Equipment (FSE) - JSC
13. Others as identified and required

An audit planning schedule will be developed for conduct of these audits and will be updated as required.

- b. Formal notification shall be documented and transmitted to the affected program element/project at least 30 days prior to the planned audit. The notification will be signed by the team Chair and shall include the following information as applicable:
 1. Audit subject
 2. Inclusive dates of audit
 3. Audit team members
 4. Site of the audit
 5. Copy of the audit plan
 6. Request for conference room space, organizational charts, documentation, telephone facilities, logistics support, etc.
- c. The pre-audit conference will be conducted at the program element/project site. The conference shall include the team Chair, selected team members, and key personnel from the audited organization.

The conference shall serve the purpose of reviewing the areas to be audited as identified in the formal notification, making changes to and/or confirmation of the areas, and firming up specifics relative to the audit requirements and support needed.

- d. The audit shall be conducted in accordance with the following:
 - 1. Conduct an entrance meeting at the audit site at which time the audit team members will meet with appropriate personnel from the audited organization. The Chair and/or selected team members shall present the purpose and scope of the audit. If requested by the audit team Chair, the organization to be audited shall brief the review team on the audited organization's operations and specific subjects of interest to the audit team.
 - 2. Conduct the audit utilizing the requirements of NSTS 07700, Volume IV - Book 1. Audit checklists, see Paragraph 5.0, which illustrate the type of information of concern to the SSP audit team, shall be used as a guide for conducting the audit.
 - 3. Conduct meetings of team members or individuals, as directed by the Chair, to establish requirements for reviewing daily activities, adjust schedules as needed, and to coordinate the subsequent review activities.
 - 4. Consolidate daily results in preparation for the exit critique.
 - 5. Conduct exit critique with program element/project personnel, and discuss the preliminary results of the audit. The program element/project personnel will be given an opportunity to explain any unusual or discrepant information obtained. The critique will normally be held the day following completion of the audit.
- e. Team members shall document and maintain accurate records of findings/observations, including substantiating backup information, within their assigned areas during the audit. Findings/observations will be identified and documented utilizing JSC Form 1330 (Figure G-1). See Paragraph 6.0 for detailed instructions and procedures for preparation of JSC Form 1330. A summary of the findings together with all JSC 1330 forms shall be presented to the team Chair by each team member prior to the exit critique. This summary will contain an accurate description of nonconformances in sufficient detail as to provide conclusive evidence of the existing situation. These summaries along with JSC 1330 forms should be the basis for discussion during the exit critique.
- f. The team Chair shall be responsible for preparation and approval of meeting minutes and the initial and final audit reports.
 - 1. Maintenance of the SSP audit team minutes will be the responsibility of the team Chair. This responsibility encompasses all official gatherings of audit personnel, and specifically the preliminary meeting, pre-audit meeting, pre-audit conference, entry meeting, daily audit meetings, and exit critique.

2. The initial audit report will be prepared and published within three weeks after conclusion of the audit. This report shall be a consolidation of the findings and/or observations, descriptions, determinations, and recommendations. This report will contain a complete description of required actions resulting from the audit and will utilize JSC Form 1330 to depict both open and closed audit actions. As an organizational guide, the following elements shall be included in the report:

- (a) Introduction

- (1) Audit title
- (2) Audited organization
- (3) Audit subject
- (4) Audit site
- (5) Inclusive dates of audit
- (6) Participating personnel
- (7) Approval signatures
- (8) Date report issued
- (9) Reason for audit
- (10) Objectives and scope
- (11) Background information

- (b) Summary

- (1) A general overall SSP audit team reaction with the most significant findings summarized

- (c) Organization

- (1) Organization chart of audited program element/project, including identification of organizational relationships and interfaces
- (2) Brief description, including number of personnel and organization's responsibilities

- (d) Audit results

- (1) Findings/observation

- (2) Recommendations
 - (3) Corrective actions taken by the time of conclusion of the audit
 - (4) Schedule of corrective actions to be taken
- 3. The final audit report shall include all of the above plus those corrective actions taken and approved by the applicable program element/project manager or his designated representative subsequent to the audit and approved by the SSP audit team Chair.
- 4. The audit team Chair will transmit copies of all approved audit reports to the appropriate program element/project.
- g. The audit team Chair will prepare a letter of instructions from the Manager, Space Shuttle Program to implement corrective action for deficiencies identified during the audit. The SSP audit team also will take all proper follow-up action (including repeat audit if necessary) to verify that directed corrective actions are implemented. Audited organizations are required to report monthly status until all deficiencies have been corrected and closed out. As corrective actions are taken, these shall be documented on JSC Form 1330 for the individual audit actions, signed by the program element/project manager or designated representative and transmitted to the SSP audit team Chair. The audit team Chair shall approve or disapprove the audited organization's corrective action and shall formally notify the audited organization.

5.0 AUDIT CHECKLISTS

Audit checklists will be provided to guide each team member's audit activities. The audit checklists will address the type of information which may be of concern to the audit team and will be constructed to satisfy the need of each particular audit. The checklists will address the following subjects, as applicable:

- a. Organization
- b. Identification
- c. Verification
- d. Change control
- e. Status and accounting
- f. Interface control

6.0 INSTRUCTIONS FOR PREPARATION OF SSP CM AUDIT EVALUATION REPORT

- a. General Instructions: An audit Evaluation Report, JSC Form 1330 (see Figure G-1) shall be prepared for each finding and/or observation by the SSP audit

team. If the information requested by a block on the form is not known, that fact shall be noted on the form.

b. Completion Instructions: Complete each block on the form as follows:

1. Enter the SSP element/project organization being audited (i.e., audited organization).
2. Enter the audit accounting number assigned by the audit team Chair.
3. Enter the date of the finding/observation.
4. Enter the name of the SSP team auditor.
5. Identify the building number and room number where finding/observation took place.
6. Identify the requirement in NSTS 07700, Volume IV - Book 1 by page number, paragraph number, etc., if applicable.

7A. This is a description of the finding/observation:

- (a) Finding is a deviation from a documented requirement, and is a statement of the fact(s) identifying the deficiency observed.
- (b) Observation is a suggestion for improving operations not based on a specific requirement, or acknowledgment of a commendable practice.

7B. This is an expanded and/or an additional description which substantiates the findings(s), as well as provides related information.

8. This is a statement of suggested action(s) intended to correct the deficiency noted.
9. Enter the signature of the SSP team auditor. This is the same name as Block 4 above.
10. Enter the approval signature of the SSP audit team Chair.

NOTE: Signatures for Blocks 9 and 10 are obtained when Blocks 1 through 8 have been filled in.

11. This is a statement of corrective action(s) taken by the audited organization to correct the deficiency noted.

NOTE: JSC Form 1330 will be contained in the monthly status report from the audited organization (see Paragraph 4.0g). These report

forms are a means of providing an organized approach with systematic accounting.

12. When Block 11 has been filled in, the program element/project manager or his designated representative will enter his approval signature.
13. When Block 11 meets with the approval of the SSP audit team Chair, he will enter his signature.

FIGURE G-1

SPACE SHUTTLE PROGRAM CM AUDIT EVALUATION REPORT

SSP CM AUDIT EVALUATION REPORT		PAGE ____ OF ____
1. SSP ELEMENT/PROJECT:	2. NO.:	
	3. DATE:	
4. SSP TEAM AUDITOR:	5. LOCATION:	
6. REQUIREMENT:		
FINDING/OBSERVATION:		
7a.		
7b.		
8. RECOMMENDATION:		
9. SSP TEAM AUDITOR:	10. SSP AUDIT TEAM CHAIRMAN:	
11. CORRECTIVE ACTION:		
12. SSP ELEMENT/PROJECT MANAGER:	13. SSP AUDIT TEAM CHAIRMAN:	

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APPENDIX H (DELETED)

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APPENDIX K

**PROCEDURE FOR PROCESSING SPACE SHUTTLE PROGRAM
CHANGES REQUIRING IMMEDIATE ATTENTION**

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APPENDIX K

PROCEDURE FOR PROCESSING SPACE SHUTTLE PROGRAM CHANGES REQUIRING IMMEDIATE ATTENTION

1.0 PURPOSE

This appendix specifies the procedures which will be used to process SSP changes which require immediate attention to preclude an adverse programmatic impact. It establishes and outlines the responsibilities for participating organizations.

2.0 SCOPE

All SSP elements/projects will operate within the guidelines established herein. SSP CR originators are required to follow the procedures outlined.

3.0 RESPONSIBILITIES

The SSP “changes requiring immediate attention” process as described in this appendix is the responsibility of the Manager, Space Shuttle Management Integration.

3.1 SPACE SHUTTLE PRCB SECRETARY

The Space Shuttle PRCB Secretary is assigned the primary responsibility for accepting, coordinating, and processing all SSP CRs handled within the scope of this procedure. Additionally, the PRCB Secretary will act as the SSP primary focal point for accomplishing the following:

- a. Upon notification (oral or written) of a requested change to the SSP baseline which requires immediate attention, will determine the urgency of the request through contact with the principals concerned. This initial review will determine whether the request should be dispositioned through immediate verbal authorization, or whether a Special Space Shuttle PRCB should be convened.
- b. As required, establish a Space Shuttle PRCB meeting (utilizing teleconferencing as necessary) with the program participants concerned with the particular CR.
- c. Prepare the PRCBD that documents the decision of the Space Shuttle PRCB Chair and depicts the programmatic impacts if any.

3.2 CHANGE ORIGINATOR

The change originator will be responsible for the following:

- a. Initiate the requested change (oral or written) to the SSP baseline and contact the PRCB Secretary.

- b. Ensure that reproducible presentation data can be accessed at all teleconference sites for dissemination to Space Shuttle PRCB members when required.
- c. If a CR has not been previously submitted, the change originator will forward a CR, for record purposes, immediately subsequent to the meeting.

4.0 TELEPHONE CONTACT NETWORK

SSP elements/projects will designate primary and alternate contacts (Paragraph 5.0) and provide their names and telephone numbers to the Space Shuttle PRCB Secretary.

5.0 TELEPHONE CONTACT NETWORK FOR CHANGES REQUIRING IMMEDIATE SSP ATTENTION

A directory of key personnel and their areas of responsibility is maintained by the Space Shuttle Management Integration Office to assist in arranging support to the immediate processing of subject changes. This directory will be coordinated with the SSP element/project contacts and updated as required. Corrections, deletions, or additions to this directory should be forwarded to the PRCB Secretary.

APPENDIX L (DELETED)

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APPENDIX M

**CONFIGURATION MANAGEMENT PLAN/PROCEDURES FOR
COMPUTER PROGRAM FLIGHT SOFTWARE**

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APPENDIX M

CONFIGURATION MANAGEMENT PLAN/PROCEDURES FOR COMPUTER PROGRAM FLIGHT SOFTWARE

1.0 PURPOSE

The purpose of this appendix is to establish the configuration management requirements and implementation procedures for all Space Shuttle computer program software contained in the Mass Memory (MM).

2.0 SCOPE

This appendix is applicable to the following deliverable computer programs from the point of product release baseline through vehicle usage:

- a. Orbiter Primary Avionics Software System (PASS)
- b. Orbiter Backup Flight Software (BFS)
- c. Display Electronics Unit (DEU) Software and Selftest
- d. Initial Program Load (IPL)
- e. Test Control Sequences (TCS)
- f. Payload Software

3.0 RESPONSIBILITIES

The Space Shuttle computer program flight software process as described in this appendix is the responsibility of the Manager, Avionics and Software Office.

4.0 FLIGHT SOFTWARE RELEASE BASELINES

4.1 GENERAL

Computer Program End Items (CPEIs) shall be baselined by the responsible software development organization in accordance with NSTS 07700, Volume IV - Book 1. CPEIs and associated data packages in accordance with SN-S-0008/NSTS 08338/JSC 22320, Class I Integration Plan (CIP), are delivered to NASA/JSC for processing by the Software Production Facility for the creation of a MM load tape. The load tape with its associated SN-S-0008 products and data package are baselined by the SASCB and delivered to the user through the Software Development Organization for subsequent

testing and operational usage (see Figure M-1). The release requirements/procedures and build process for MM are defined in NSTS 08338 and JSC 22320. The following requirements and procedures pertain to configuration identification, control, accounting, and verification of the MM software.

4.2 GPC FLIGHT SOFTWARE (FSW) OPERATIONAL INCREMENTS

All CRs for functional changes to GPC FSW shall be dispositioned, implemented, verified, and released for a specified OI.

Each OI release baseline shall be specified in an OI baseline definition CR as the collection of individual CRs (identified by number and title approved by the SASCB for that OI). The determination of which CRs to include shall be based on priorities defined by the PRCB and available software skills.

The nominal interval between OI releases shall be 12 months. The nominal interval from OI baseline approval by the SASCB to earliest first flight use of an OI is 30 months. OI-specified deviations from the nominal intervals may be approved by the SASCB.

5.0 CONFIGURATION IDENTIFICATION

5.1 SOFTWARE IDENTIFICATION

Each software development organization shall establish an identification numbering system which shall uniquely identify its assigned deliverable CPEIs and any change.

5.1.1 Mass Memory Identification

A unique integrated system number shall be assigned for each MM release and its associated deliverable product(s) and data packages as specified by NSTS 08338.

5.2 DOCUMENTATION

CPEI data packages shall conform to the requirements as specified in SN-S-0008, at the time of delivery. Specific media, quantity, and delivery schedule shall be as specified in NSTS 08338.

6.0 CONFIGURATION CONTROL ORGANIZATIONS, AUTHORITY AND RESPONSIBILITIES

The SSP configuration control organizations/relationships are shown in Figure M-2 for MM requirements and product baseline. The authority, responsibilities and membership of each organization is as follows.

6.1 SPACE SHUTTLE PROGRAM REQUIREMENTS CONTROL BOARD

The authority, responsibility, and organization of this board are specified in NSTS 07700, Volume IV - Book 1, Paragraph 4.3.2.1.

6.2 SPACE SHUTTLE VEHICLE ENGINEERING CONTROL BOARD

The authority, responsibility, and organization of the VECB are specified in NSTS 07700, Volume IV - Book 1, Paragraph 4.3.2.3.

6.3 SHUTTLE AVIONICS SOFTWARE CONTROL BOARD

The authority, responsibility, and organization of the SASCB are specified in NSTS 07700, Volume IV - Book 1, Paragraph 4.3.2.3.3.

6.4 SOFTWARE DEVELOPMENT ORGANIZATION

The software development organizations are responsible for the development of their assigned software to meet the baselined requirements. The element control boards are responsible for:

- a. Baselineing and controlling changes to software requirements in compliance with SSP requirements and applicable ICDs in accordance with Paragraph 7.1.
- b. Establishing product baselines (release), including version release effectivity of approved CR.
- c. Defining and maintaining element release schedules in accordance with NSTS 08338.
- d. Performing quality assurance and test functions on each delivery to assure that it conforms to the applicable product baseline (release) and complies with the requirements of SN-S-0008, NSTS 08338, and JSC 22320.
- e. Providing software development support to delivered software as required for problem diagnosis and correction.
- f. Provide consultation and/or on-site support as required for timely resolution of software problems.
- g. Screen identified problems to determine whether the problem is a deficiency in requirements or design. Processing of the resolution of problems shall be in accordance with Paragraph 7.2.
- h. Support configuration control of delivered software by assuring that software problems are recorded and resolved according to approved and controlled procedures (see Paragraph 7.2).

- i. Coordinate with the user on the type and schedule of maintenance releases required to correct software problems.
- j. Responsible for release of SASCB approved software in accordance with NSTS 08338.

7.0 CHANGE PROCESSING

Changes to the MM software configuration will be initiated as CRs except as noted in Paragraph 7.3 or as Discrepancy Reports (DRs) for correction of design or code deficiencies. Processing requirements for CRs are specified in Paragraph 7.1 and in Paragraph 7.2 for DRs. The disposition of CRs or DRs by the Software Development Organization does not authorize their implementation on MM or in Shuttle computers. All changes to MM or Shuttle computer memories shall be authorized by the SASCB.

7.1 CR PROCESSING (SEE FIGURE M-3)

7.1.1 Changes to Software Functional/Design Requirements

The content (software) of each MM element (program) is specified in a requirements document which is controlled by the SASCB. The assignment of document change authority is defined in NSTS 07700, Volume IV - Book 1 and Volume V. The functional elements of CR processing to be applied by the Software Development Organization are:

- a. CR identification (PCIN) and status accounting.
- b. CR definition sufficient for complete technical evaluation.
- c. CR coordination sufficient to assure that significant impacts are identified.
- d. CR implementation per SASCB disposition (approve, disapprove, defer with assigned actions, or refer to a higher board). Requirements and procedures for Space Shuttle PRCB referral and/or appeal are defined in NSTS 07700, Volume IV - Book 1, Appendix C.
- e. Notification of CR disposition to all impacted elements and organizations.

7.1.2 Changes to Software Release Requirements and Procedures (NSTS 08338)

Changes to the software release requirements, schedules, and procedures must be coordinated through the Software Development Organization. The Software Development Organization Chair will forward (or initiate) an appropriate CR to the SASCB for disposition.

7.2 DISCREPANCY PROCESSING

7.2.1 Discrepancy Reporting Initiation

Anomalies discovered by MM software users shall be documented. Anomaly isolation and DR initiation shall be in accordance with the user's appropriate standard operating procedure.

7.2.2 Software Development Organization

Upon receipt of a DR, the Software Development Organization shall log the DR in a discrepancy accounting system and notify all other users of the anomaly. A recommended resolution of the DR shall be developed and coordinated with the DR initiator. The DR resolutions are:

- a. Invalid DR, software meets requirements
- b. Invalid DR, procedures/facility/hardware error
- c. Valid DR, code or design deficiency and requires corrective action or waiver

For DRs with corrective action, the SASCB approved corrective action release shall be coordinated by the Software Development Organization in accordance with NSTS 08338 and distributed to all affected users. For DRs initiating a request for waiver, the Software Development Organization shall disposition the request for waiver. For those waivers which require procedural workarounds, the workaround will be documented as an operational note and be forwarded with the waiver for approval. Disapproved requests for waiver shall be processed as DRs requiring corrective action. Approved waivers shall be processed through the SASCB. SASCB approved waivers shall be provided to the affected users in accordance with NSTS 08338. SASCB disapproved waivers shall be processed as a DR requiring corrective action. Users have the right to appeal waivers to the Space Shuttle PRCB. If a requirement change/deletion is necessary, a CR will be processed in accordance with Paragraph 7.1.

7.3 SOFTWARE APPROVAL SHEET

A Software Approval Sheet (SAS) or equivalent form may be used in lieu of a CR under the following conditions.

7.3.1 Temporary Patch

When a temporary patch is required to support facility design constraints/anomalies, to perform a specific test, or to permit problem analysis or troubleshooting, an SAS shall be submitted for patch development and authorization. These patches are identified as

facility/test unique and are considered to be temporary patches in that they shall not be used for flight (i.e., ground test only).

When a temporary facility/test unique patch is required for vehicle or verification testing, the SAS must be subsequently submitted to the SASCB for approval prior to patch implementation.

7.3.2 Requirements Change

When a requirements change must be implemented on an expedited basis where testing is significantly impacted by not implementing the change, and the time constraints do not permit formal CR processing in accordance with Paragraph 7.1, an SAS shall be submitted to the SASCB for authorization to implement the temporary change. Concurrent with the SAS initiation, a CR shall be initiated to formalize the change required by the SAS.

7.4 EMERGENCY CHANGES

When a discrepancy is encountered which impacts testing and requires an immediate fix to prevent work stoppage, an emergency condition shall be considered to exist. When this condition occurs, the facility encountering the problem is authorized through the on-site Software Development Organization representatives to generate and implement an emergency patch to prevent work stoppage. These emergency patches will be authorized by the appropriate user control board for a period not to exceed 48 hours. Within 48 hours of the above condition, the on-site representative of the software development organization shall notify and process a DR and/or SAS for processing in accordance with Paragraph 7.2 or 7.3.

If the SASCB disapproves the emergency patch, the facility shall remove the patch and restore the original configuration.

7.5 SOFTWARE RELEASE

All software releases shall be in accordance with SN-S-0008 and NSTS 08338.

8.0 MASS MEMORY CONFIGURATION ACCOUNTING

JSC shall maintain a program-wide MM software configuration accounting system for CRs. The Software Development Organization shall maintain a software configuration accounting system for DRs. The accounting systems shall maintain a status of both CRs and DRs from initiation through closure.

9.0 CONFIGURATION VERIFICATION

Each MM release shall contain information sufficient to uniquely identify the release, install the release, and verify the as-installed MMU configuration. The facility, with on-site Software Development Organization assistance, is responsible for verifying that the release is correctly installed and maintained.

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FIGURE M-1
SOFTWARE PRODUCT FLOW

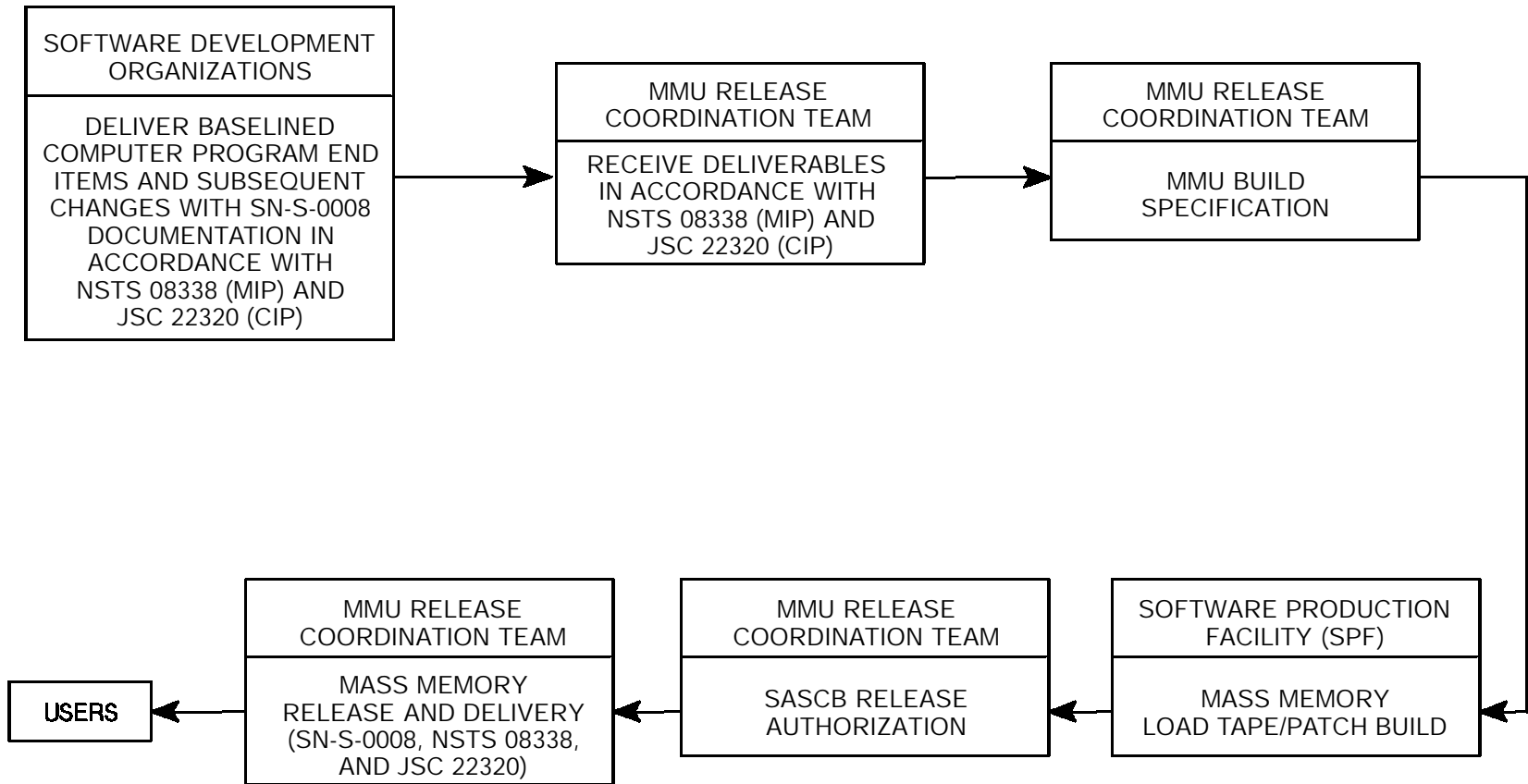


FIGURE M-2
MASS MEMORY CONFIGURATION CONTROL
ORGANIZATIONS/RELATIONSHIPS

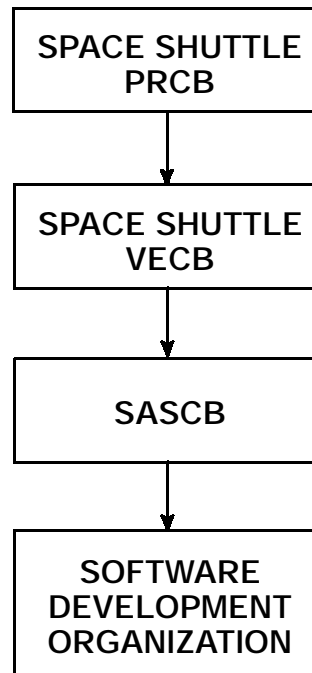


FIGURE M-3
FUNCTIONAL FLOW OF CRs

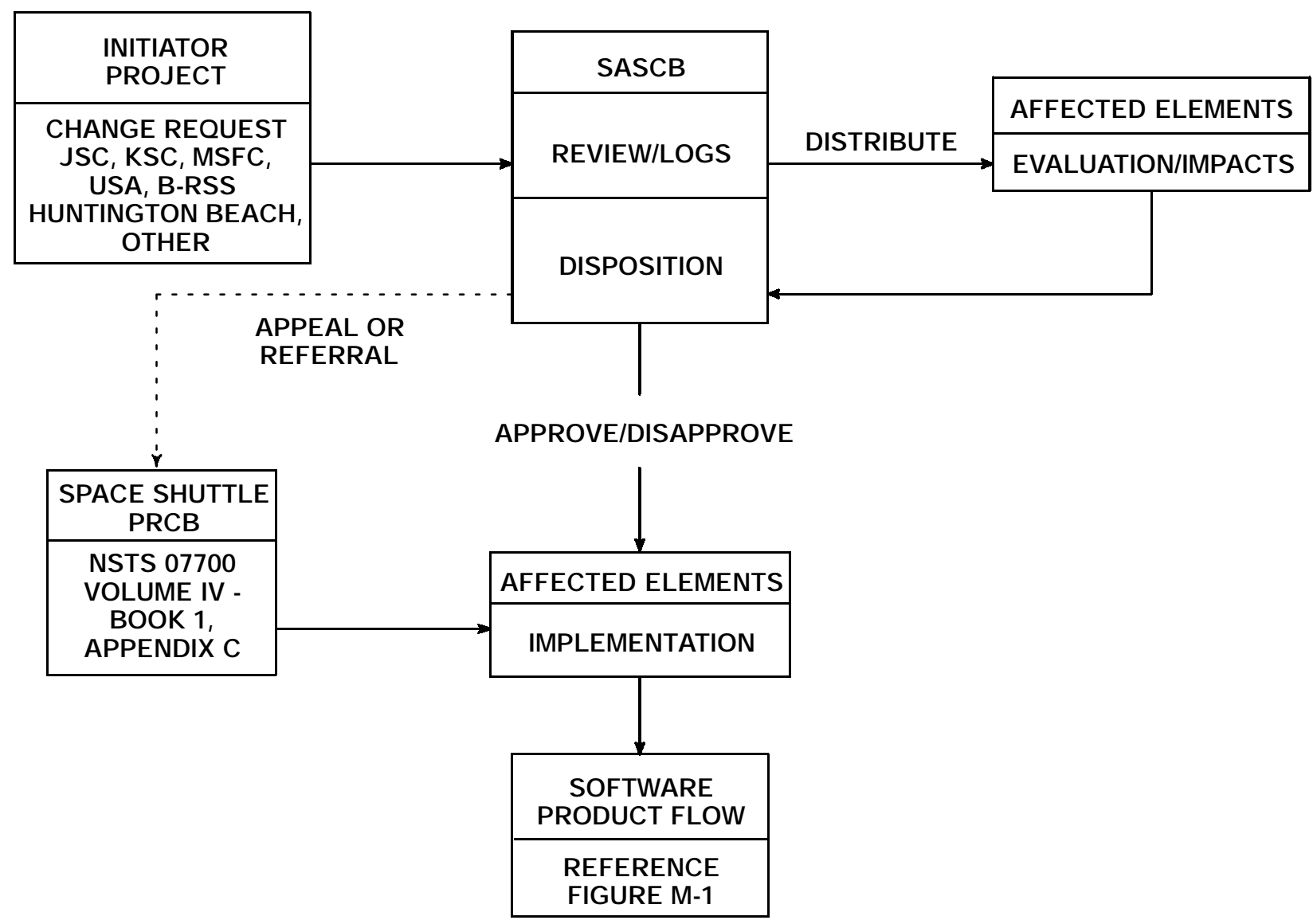


FIGURE M-4 (DELETED)

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APPENDIX N

PROCEDURES FOR CONFIGURATION MANAGEMENT OF ACCEPTED FLIGHT HARDWARE/SOFTWARE BY SPECIAL DAILY SPACE SHUTTLE PROGRAM REQUIREMENTS CONTROL BOARD

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APPENDIX N

PROCEDURES FOR CONFIGURATION MANAGEMENT OF ACCEPTED FLIGHT HARDWARE/SOFTWARE BY SPECIAL DAILY SPACE SHUTTLE PROGRAM REQUIREMENTS CONTROL BOARD

1.0 PURPOSE

This appendix delineates the procedures for operation of the Special Daily Space Shuttle PRCB meetings established to disposition flight hardware/software changes subsequent to acceptance review.

2.0 SCOPE

This appendix concerns flight hardware/software changes which require Special Daily Space Shuttle PRCB review as required by NSTS 07700, Volume IV - Book 1, Paragraph 4.2. Flight hardware/software changes requiring Special Daily Space Shuttle PRCB review are those changes that impact the SSP Acceptance Baseline and affect implementation and/or preparation activities for Space Shuttle flights. Any change to prior-to-acceptance flight hardware/software will be forwarded to the regular PRCB for disposition. Specifically, the criteria for the submittal of a change to the Special Daily PRCB for review and disposition are documented in NSTS 07700, Volume IV - Book 1, Paragraphs 4.4.13.6, 4.4.13.7a, and 4.4.13.8a.

3.0 POLICY

Special Daily Space Shuttle PRCB meetings will be conducted to assure a coordinated, timely review by all affected SSP elements/projects of changes to accepted flight hardware/software which meet the criteria of Paragraphs 4.4.13.6 and 4.4.13.7, and to assure expeditious SSP disposition of all such changes. Those flight hardware/software changes will continue to be processed through the existing SSP element/project configuration control channels. Flight hardware/software changes that do not meet the criteria for the Special Daily Space Shuttle PRCB review will be processed in accordance with Appendix C. SSP review and disposition of changes to accepted flight hardware/software will be expedited to minimize impact on flight preparation activities but will assure thorough review and consideration of all impacts. Any changes which affect element maximum design control weight or ascent flight performance for the ISS mission shall be submitted to the regular Space Shuttle PRCB.

4.0 RESPONSIBILITIES

The Space Shuttle Management Integration Office is responsible for implementing the change control process in support of the Special Daily PRCB.

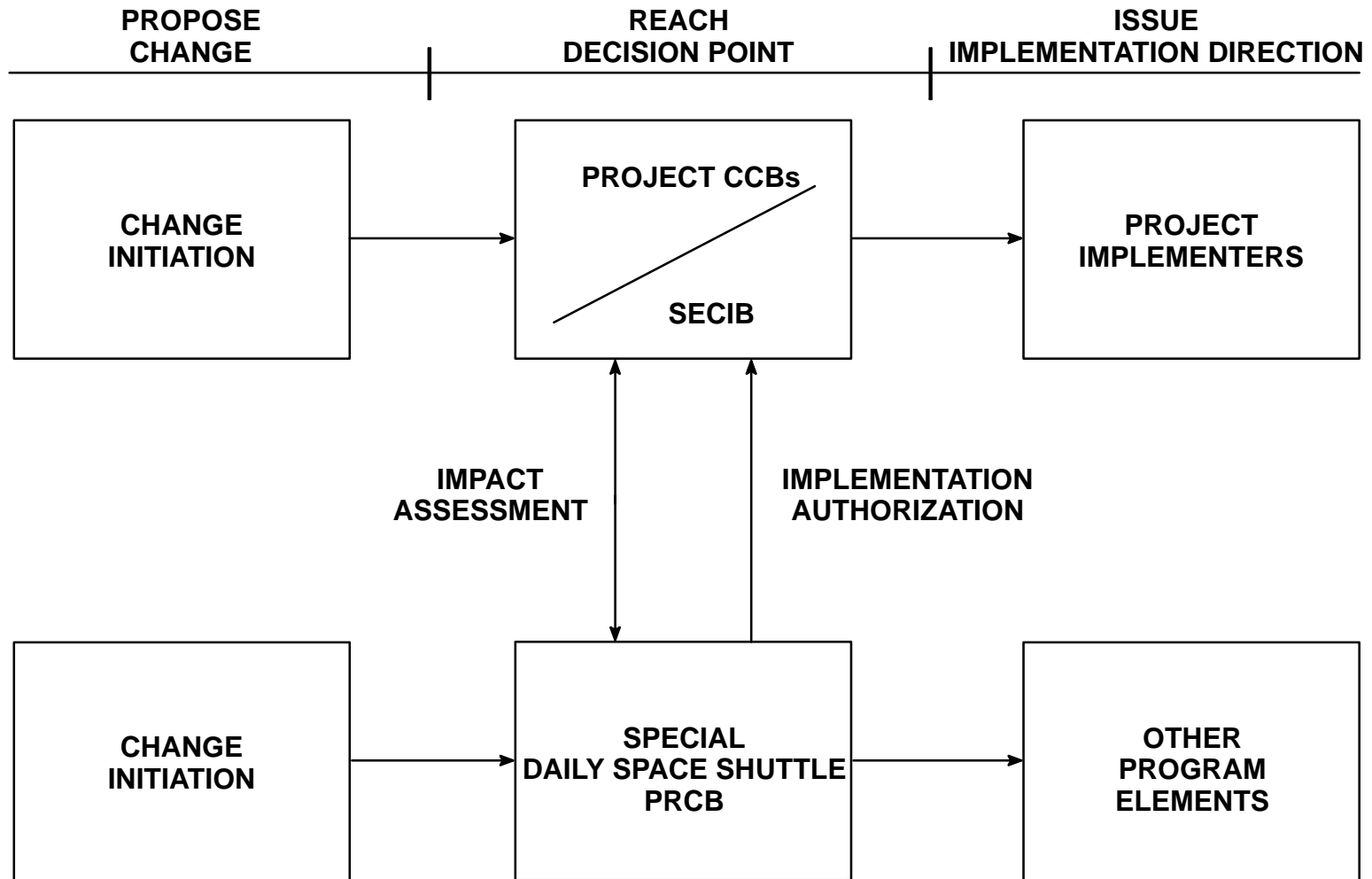
5.0 PROCEDURES

- a. Special Daily Space Shuttle PRCBs will be held by teleconference to review and disposition changes on the agenda.
- b. Subsequent to identification of a flight hardware/software change or nonstandard work which requires review by a Special Daily PRCB, the initiating organization shall provide change documentation that describes the change and all known impacts to the Space Shuttle PRCB Secretary. The PRCB Secretary will prepare the agenda for the Special Daily PRCB, draft a proposed PRCBD, and enter this data into the BARS utilizing the assigned PCIN. Changes received prior to 11:00 a.m. Eastern time will be listed on the Special Daily Space Shuttle PRCB Agenda for the following day (or next scheduled meeting). Copies of the change documentation will be distributed with the agenda and draft PRCBDs for the current day's meeting. This provides affected Space Shuttle Program organizations 24 hours to assess impacts of the change.
- c. SSP CM coordinators will be able to access the proposed agenda and draft PRCBDs for affected/member organizations at those sites. Deadline for a change to be placed on the agenda for a Special Daily PRCB is 11:00 a.m. Eastern time, 24 hours prior to the day of the meeting. Changes requiring addition to the agenda subsequent to the deadline must be coordinated with the Space Shuttle PRCB Secretary.
- d. The draft PRCBD will be modified as required to reflect the PRCB decision and signed by the Chair. Minutes and directives of the Special Daily Space Shuttle PRCB will be entered into BARS within 24 hours after the meeting and provided to SSP CM coordinators and affected SSP elements/projects.
- e. Prior to each Special Daily PRCB, each board member will evaluate the impact(s) of the changes on the agenda for that day's Special Daily PRCB.
- f. When a change requires expedited review and approval and is placed on the Special Daily Space Shuttle PRCB agenda, without the 24-hour review period specified in Subparagraphs b and c, the change description documentation will be expedited. Concurrent with or, at the latest, within 24 hours of project approval of a proposed expedited change the project manager or designated representative shall identify the change to and furnish a copy of the documentation describing the change to the Space Shuttle PRCB Secretary (Figure N-1). The project managers are encouraged to initiate Space Shuttle PRCB or Special Daily Space Shuttle PRCB change disposition activities at the earliest practical time.

- g. The KSC Shuttle Engineering Change Implementation Board (SECIB) shall assure that all changes to accepted flight hardware/software have been authorized by the PRCB or the Special Daily PRCB or SSP delegated authorities prior to implementation in the accepted flight hardware/software. Exception to this procedure is specified in the emergency change provisions of NSTS 07700, Volume IV - Book 1, Paragraph 4.4.3.2.1.
- h. Emergency changes that have been implemented pursuant to NSTS 07700, Volume IV - Book 1, Paragraph 4.4.3.2.1 will be reviewed and dispositioned at the next Special Daily Space Shuttle PRCB meeting subsequent to change initiation.
- i. SPARs which authorize emergency cannibalization requests to prevent work stoppage, shall be forwarded to the Space Shuttle PRCB for final approval authorization within 48 hours of project approval.

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FIGURE N-1
SPECIAL DAILY SPACE SHUTTLE PRCB CHANGE FLOW



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APPENDIX P

**CONFIGURATION MANAGEMENT PLAN/PROCEDURES
FOR FLIGHT SOFTWARE RECONFIGURATION DATA BASES**

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APPENDIX P

**CONFIGURATION MANAGEMENT PLAN/PROCEDURES
FOR MEASUREMENT/STIMULI RELATED DATA BASES**

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APPENDIX P

CONFIGURATION MANAGEMENT PLAN/PROCEDURES FOR FLIGHT SOFTWARE RECONFIGURATION DATA BASES

1.0 PURPOSE

The purpose of this appendix is to define the CM requirements and processes for the non-I-Load portion of the flight software reconfiguration process. Specifically, the Measurement and Stimuli (MAST) II and the Space Transportation Automated Reconfiguration System (STAR) activities including the responsibilities of the Shuttle Data Control Board (SDCB). The flight software reconfiguration process applicable requirements documents are shown in Table P.1. The reconfiguration database process flow is shown in Figure P-1.

2.0 SCOPE

This appendix is applicable to the process by which requirement additions and changes are made to the reconfiguration requirements for Space Shuttle payloads, Orbiter vehicles, SSMEs, Solid Rocket Boosters (SRBs), ETs, special KSC ground processing requirements, including vehicle test and checkout requirements and the JSC/MCC.

- a. Flight Software Reconfiguration database
 - 1. MAST II Database
 - (a) Orbiter, SRB, ET, and SSME data measurements
 - (b) Telemetry format load configurations
 - (c) Commands
 - (d) Calibration and other data attributes
 - 2. STAR Database
 - (a) Primary flight software Systems Management (SM) data measurements
 - (b) Payload Data measurements and data attributes
 - 3. Ground Software Database
 - (a) KSC test configuration identifier
 - (b) JSC/MCC

(c) JSC SAIL

(d) JSC Shuttle Mission Simulator

3.0 RESPONSIBILITIES

The Space Shuttle MAST II and STAR database/reconfiguration process, as described in this appendix, is the responsibility of the Manager, Avionics and Software Office.

4.0 GENERAL

The MOD Flight Avionics Division is responsible for the management of the STAR and MAST II databases. These databases are managed by MOD with control responsibility delegated from the Space Shuttle PRCB and the SASCB.

5.0 CONFIGURATION CONTROL ORGANIZATIONS, AUTHORITY, AND RESPONSIBILITIES

The SSP configuration control organizations/relationships are shown in Figure P-2 for the Flight Software Reconfiguration Configuration Control Organization/Relationships. The authority, responsibilities, and membership of each organization is as follows:

5.1 SPACE SHUTTLE PROGRAM REQUIREMENTS CONTROL BOARD

The authority, responsibility, and organization, for this board is specified by NSTS 07700, Volume IV - Book 1, Paragraph 4.3.2.1.

5.2 SPACE SHUTTLE VEHICLE ENGINEERING CONTROL BOARD

The authority, responsibility, and organization of the VECB are specified in NSTS 07700, Volume IV - Book 1, Paragraph 4.3.2.3.

5.3 SHUTTLE AVIONICS SOFTWARE CONTROL BOARD

The authority, responsibility, and organization of the SASCB are specified in NSTS 07700, Volume IV - Book 1, Paragraph 4.3.2.3.3.

The SASCB is the SSVEO's controlling authority for changes to the Shuttle flight software interfaces with ground-based computer systems and to the SAIL requirements. All proposed changes to released configurations of the Shuttle flight software shall be dispositioned by the SASCB or the Space Shuttle PRCB before implementation. The SASCB governs the procedures and products that define the delivery of the Space Shuttle flight software, telemetry configurations, electronic measurements and stimuli, and associated data attributes.

5.4 SASCB SHUTTLE DATA CONTROL BOARD

The SASCB has delegated the dispositioning of electronic vehicle definition and electronic mission definition DCRs to the SDCB Chair, a NASA person residing in the MOD/DL/Avionics Division. The SDCB Chair is responsible for preparing the pre-board agenda to support the Shuttle Program schedules as defined by the FPSWG. The Chair assigns action items and schedules working group meetings to resolve technical issues and problems among the SDCB representatives from the multiple element organizations.

The SDCB Chair chairs a weekly meeting DCR Pre-board for reviewing each DCR with the reconfiguration community for follow-on dispositioning at the SASCB. The SASCB recommended disposition on each DCR is documented electronically on the Software Production Facility (SPF) time shared option system via a voting screen. The Flight Software Shuttle Data Control Board membership is shown in Table P.2.

Several forums for the management of the reconfiguration systems and activities have been established. These forums include the Applications Configuration Control Panel (CCP), the SPF CCP, the Data T&O Board and the SDCB. The Applications CCP is responsible for addressing issues or problems experienced with the MAST II or STAR database systems or any other off-line reconfiguration tools. The Applications CCP is also responsible for approving the content and release schedule of MAST II and STAR upgrades. Any unresolved issues regarding release content or schedules will be forwarded to the SASCB for resolution.

5.4.1 Reconfiguration Data T&O Board

The Reconfiguration Data T&O Board chaired by the SDCB Chair is responsible for monitoring the schedules and the data products of MAST II/STAR releases to ensure timely product delivery, special deliveries, and provide the status on Problem Action Reports (PARs). PAR forms may be found in the SPF dataset 'NMAST.PAR.FORMS'.

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TABLE P.1

FLIGHT SOFTWARE RECONFIGURATION APPLICABLE DOCUMENTS

<u>Number</u>	<u>Title</u>
NSTS 07700, Volume IV	Configuration Management Requirements
NSTS 07700, Volume IV, Appendix M	Configuration Management Plan/Procedures for Computer Program Flight Software
NSTS 07700, Volume IV, Appendix N	Procedures for Configuration Management of Accepted Flight Hardware/Software by Special Daily Space Shuttle Program Requirements Control Board
JSC 18206	Shuttle Data Integration Plan (DIP), Volumes I, III
NSTS 21000	Guide for Development of Data Requirements for Annex-4, Command and Data Annex
CR 89050	SASCB Process Documentation Overview
CR 89053	SASCB Process Documentation MAST II/ STAR Reconfiguration Process
ICD-2-19001	Shuttle Orbiter/Cargo Standard Interfaces
JSC 20201	Operational Shuttle Data Reconfiguration Plan and Procedures (Volumes I, II, III)
PDP 6.4-MV-MAST	Product Development Plan for Measurement and Stimuli (MAST)

TABLE P.2
SHUTTLE DATA CONTROL BOARD MEMBERSHIP

- a. Chair
JSC/MOD/DL/Flight Avionics Division
- b. Members
Representative, MOD/DL/Flight Avionics Division
Representative, USA/Payloads
Representative, USA/SM/Vehicle
Representative, USA/Houston/Production
Representative, JSC Engineering Directorate
Representative, Boeing Reusable Space Systems/Vehicle
Representative, Boeing Reusable Space Systems/SM
Representative, USA/KSC Project Engineering/Vehicle
Representative, KSC/Boeing/Payload Ground Operations Contractor/Payloads
Representative, JSC/Safety, Reliability, and Quality Assurance (SR&QA)
Representative, MSFC/USA
Representative, Space Shuttle Program Office/MV2

FIGURE P-1

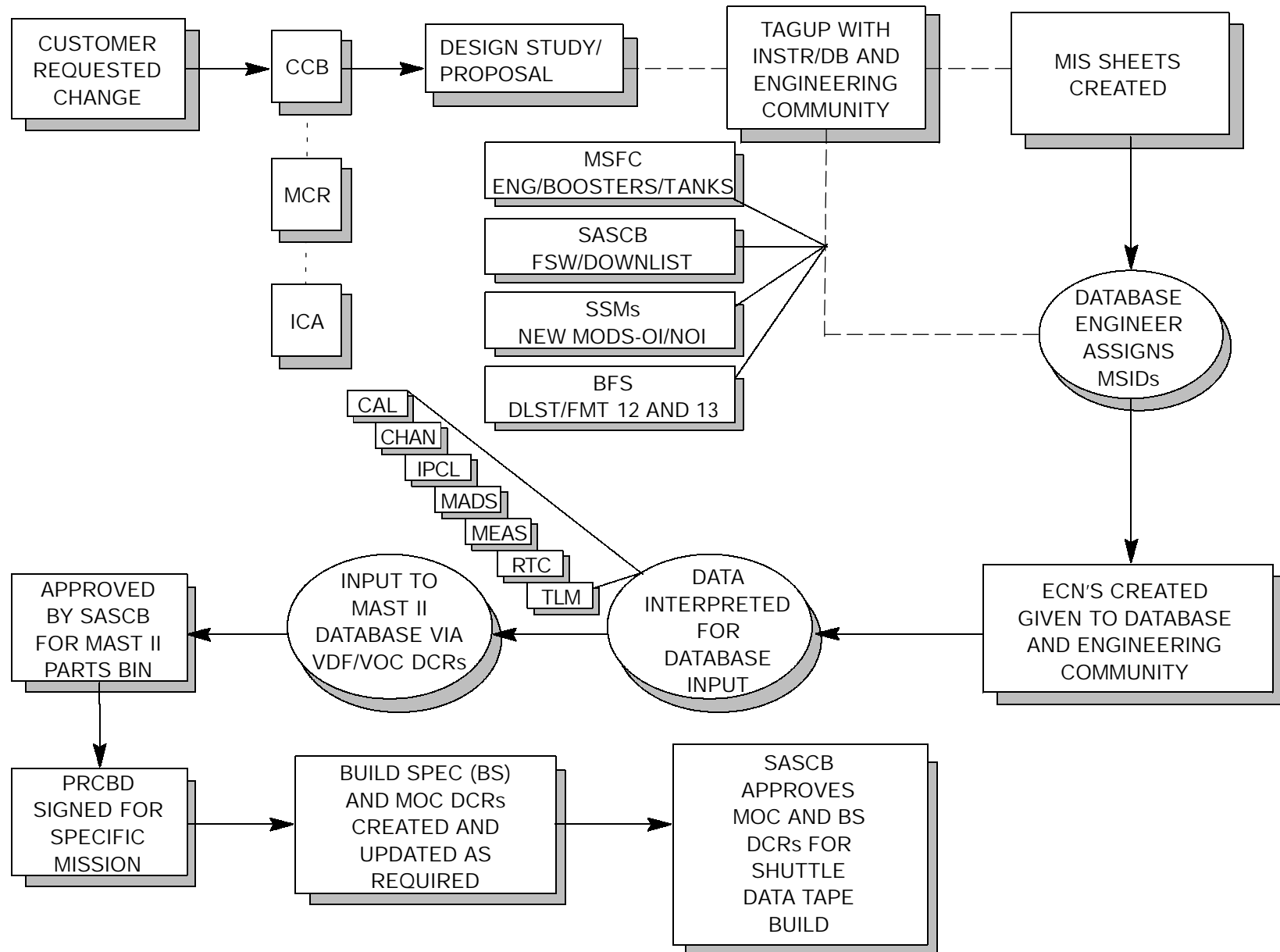
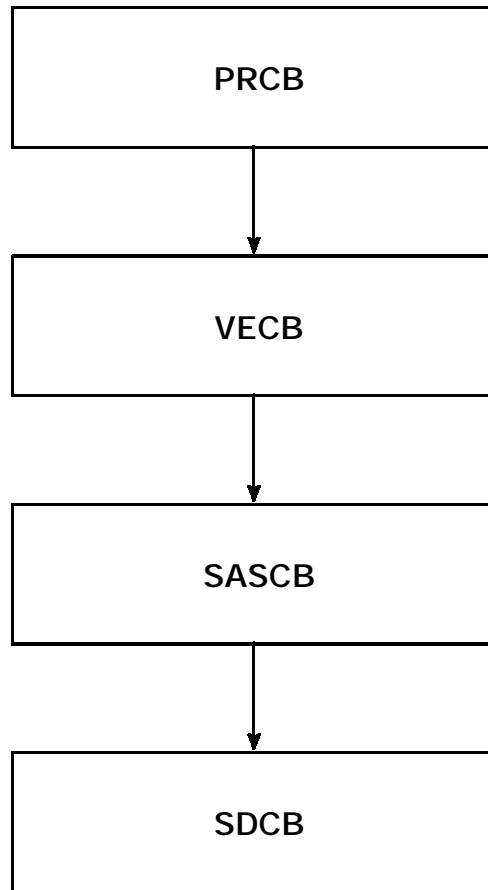


FIGURE P-2
FLIGHT SOFTWARE RECONFIGURATION CONFIGURATION
CONTROL ORGANIZATION/RELATIONSHIPS



APPENDIX Q

PROCEDURE FOR

SPACE SHUTTLE SYSTEM DESIGN CONTROL

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APPENDIX Q

PROCEDURE FOR SPACE SHUTTLE SYSTEM DESIGN CONTROL

1.0 PURPOSE

The purpose of this appendix is to establish the procedures to be followed for design control and implementation of the Space Shuttle System Assembly Drawings and changes thereto.

2.0 SCOPE

This appendix applies to all organizations involved in the preparation, review, release and implementation of Space Shuttle System Assembly Drawings. Space Shuttle System Assembly Drawings are defined as the drawings shown in Figure 3-4 of NSTS 07700, Volume IV - Book 1.

3.0 RESPONSIBILITIES

The Space Shuttle System Design Control process is the responsibility of the program element and project organizations as described in this appendix.

3.1 MANAGER, SPACE SHUTTLE PROGRAM

The Manager, Space Shuttle Program has overall responsibility for Space Shuttle System configuration control. The SFOC Contractor, as his agent, shall prepare, maintain and release as authorized by Space Shuttle PRCBDs the SSP configuration definition assembly drawing, which is identified as V072-000001.

Likewise, project design agencies (NASA/element contractors) shall prepare, maintain and release as authorized, their respective project configuration definition assembly drawings to maintain compatibility with the above SSP drawings. Project design agencies are responsible for evaluation of the SSP drawings for technical adequacy. The project design agencies shall submit SSP CRs through the appropriate project office, to the Space Shuttle PRCB Secretary regarding any necessary changes to the SSP drawings. The project offices shall implement the requirements of the SSP drawings in accordance with the instructions of the associated Space Shuttle PRCBDs.

3.2 PROGRAM/PROJECT OFFICE

The Program/Project Offices responsible for document preparation, maintenance and release are required to show correct next higher assembly drawing callouts in agreement with the documents identified in Figure 3-4 of NSTS 07700, Volume IV - Book 1. Using drawings must show correct part numbers in parts lists in agreement with the documents identified in Figure 3-4 of NSTS 07700, Volume IV - Book 1.

4.0 PROCEDURE

4.1 BASELINE CHANGE CONTROL

The Space Shuttle Top Assembly Documents (Figure 3-4) are baselined and changes are controlled in accordance with, NSTS 07700, Volume IV - Book 1, Section 4.0. After baselining, changes (as prescribed by DOD-STD-100D, Paragraph 1-302.14) to SSP drawings which would affect part number (dash number) callouts and/or technical content on any of the V072 series SSP drawings, or, in the case of the SSME Assembly Drawing, changes which would affect part number callouts on Orbiter drawing V070-410005, must be submitted to the Space Shuttle PRCB for approval prior to implementation. Approval authority for changes to SSP systems drawings that do not impact SSP cost, schedule or technical baseline is delegated to the Manager, Space Shuttle KSC Integration. The Space Shuttle KSC Integration Office will determine the program impact by coordination with the SFOC Contractor and appropriate design agencies as depicted in Figure Q-1. Each drawing and/or EO will be released by approved control board directive, SSP or project as appropriate.

4.2 DRAWING/ENGINEERING ORDER PREPARATION/RELEASE

Upon receipt of a PRCBD which directs the incorporation of a change in a document identified in Figure 3-4, the responsible program/project design agency will prepare revised drawings/EOs. Such documentation may be coordinated among concerned design agencies for evaluation of technical adequacy and for incorporation of recommendations and comments. When the responsible design agency finalizes the drawing/EO, the document is released through the design agency's engineering release system which includes:

- a. Verification of signatures, required format and release authorization (PRCBD number)
- b. Assurance of correct next assembly, parts list and usage information
- c. Review of documents and release record to ensure incorporation of outstanding EOs
- d. Application of official release stamps, or equivalent, to original documents

Drawing changes as defined below may be prepared and released using Space Shuttle PRCBD S03760F as the authorizing PRCBD number. This authority cannot be used if the drawing change affects launch site activities to any extent other than changes in identification of Document Change Notices (DCNs)/EOs or revision level of drawing(s) requiring verification in launch site work authorization documentation.

Record-type changes which are authorized by PRCBD S03760F are:

- a. Incorporation of previously approved DCNs/EOs by drawing revision.
- b. Changes in stowage/installed locations that do not affect flight hardware, crew procedures or mass properties, e.g., rearrangement/equivalent substitution of equipment within a prestowed container before its delivery to a launch site.
- c. Correction of language or numerical errors or clarification of graphics with no intent to accomplish a design change.
- d. Revision of the V072-000001, Space Shuttle Assembly Drawing, to reflect dash number rolls to the SRB general assembly drawing as well as associated updates to the Mission Requirements Control System (MRCS) data base must meet the following criteria:
 1. Changes approved prior to the SRB PDTR which are authorized by a SRB project-approved CCBD or a contractor-approved CRBD.
 NOTE: CRBDs which identify the correct dash number for the systems level drawings must be submitted to Space Shuttle KSC Integration at least five days prior to the ET/SRB Mate Milestone Review.
 2. Changes approved subsequent to the SRB PDTR and prior to ET/SRB Mate Readiness Review which are jointly approved by the L&L project and by the SRB project.

Responsible SSP/project design agencies shall provide copies of all drawing changes that have been released under PRCBD S03760F authority to the PRCB Secretary. The Space Shuttle PRCB Secretary shall review these changes after release for conformance with that authority.

4.3 DISTRIBUTION

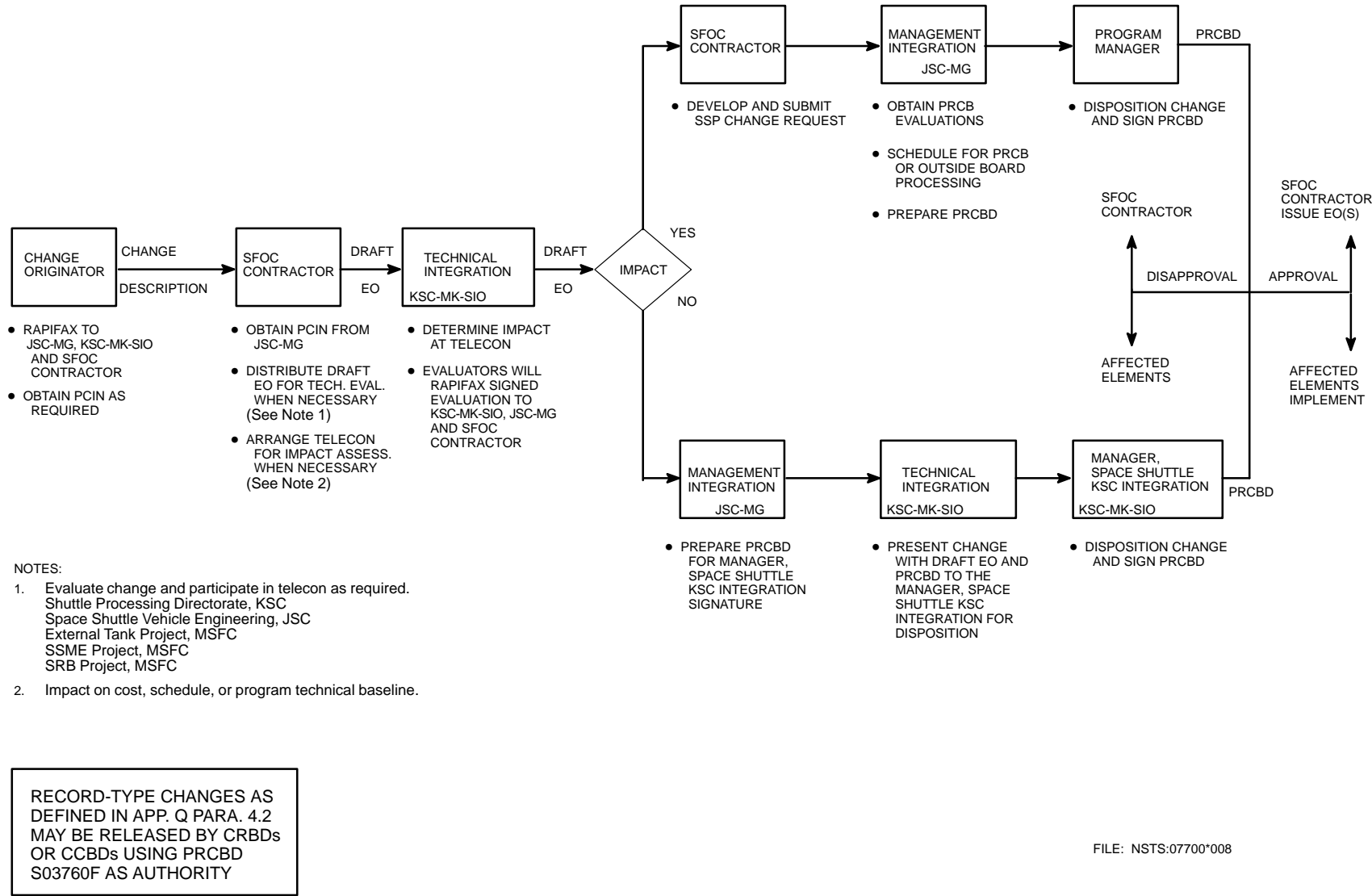
The design agency reproduces and distributes copies of released documents via the Shuttle drawing system, the official electronic repository and distribution system for engineering drawings and associated lists on the SSP, and via hard copy and microfilm aperture cards in accordance with IRDs. A copy of the released documents, or evidence of electronic distribution, is forwarded to the Space Shuttle Management Integration Office to close out the action tracked in BARS. For NASA certified repair depot activity, NSTS 08151 is used in addition to the Shuttle drawing system as a repository and distribution system for engineering drawings and associated lists.

4.4 CONFIGURATION VERIFICATION

With the release of each document, the Space Shuttle Management Integration Office makes the as-designed input into BARS to enable verification of implementation. Evidence of verification (INCs, as-run OMIs, etc.) will be input into the SSP baseline accounting system.

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FIGURE Q-1
SSP DRAWING CHANGE CONTROL



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APPENDIX R

MISSION EQUIPMENT CONFIGURATION ACCOUNTING SYSTEM

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APPENDIX R

MISSION EQUIPMENT CONFIGURATION ACCOUNTING SYSTEM

1.0 PURPOSE

This appendix is established to:

- a. Define Mission Equipment Configuration Accounting System (MECAS) requirements
- b. Establish the configuration data base(s) to be used
- c. Specify mission equipment data processing system requirements
- d. Identify mission equipment data processing system operation and file maintenance responsibilities

2.0 SCOPE

The MECAS shall be designed to track and status mission equipment assets and, for each Space Shuttle flight, verify compliance with program requirements for:

- a. Mission equipment part installation and removal requirements
- b. Incorporation of approved mission equipment modifications
- c. Accomplishment of approved deferred work transferred from mission equipment suppliers to the using site

The accounting system also shall provide reference data and data processing support to JSC crew-related GFE engineering release, pre-pack, overhaul and repair, and flight/turnaround planning activity, including cargo/Shuttle integration. The system shall provide a readily accessible, uniform data source for mission equipment requirements, and status and configuration to facilitate coordination of turnaround operations at the launch site.

3.0 RESPONSIBILITIES

The Space Shuttle MECAS process as defined in this appendix is the responsibility of the Manager, Space Shuttle KSC Integration.

3.1 MISSION EQUIPMENT DATA BASE REQUIREMENTS

The mission equipment data base shall be a part of the BARS overall configuration data base, administered as part of the Shuttle Information Management System.

3.2 ASSET TRACKING

The mission equipment data base shall include configuration, availability and location data for all mission equipment end items, in support of flight and turnaround planning.

3.3 ASSET UTILIZATION

The mission equipment data base shall contain allocation of mission equipment assets to Space Shuttle flights, in support of and resulting from flight and turnaround planning. Allocation data shall be provided to the level of part pre-pack/launch site installation, including reference to installation drawings, work authorization documents, estimated man-hours, and installation constraints.

3.4 PRE-PACK OPEN WORK

The mission equipment data base shall contain pre-pack requirements related to Space Shuttle flights, pre-pack planning data, constraints, and completion status.

3.5 LAUNCH SITE OPEN WORK

The mission equipment data base shall contain mission equipment installation/removal, deferred work and modification requirements related to Space Shuttle flights, installation planning data, pre-launch constrained events (e.g., OPF rollout), and completion status.

3.6 LANDING SITE OPEN WORK

The mission equipment data base shall contain landing site installation/removal requirements related to Space Shuttle flights, landing site planning data, constraints, and completion status.

3.7 OVERHAUL AND REPAIR OPEN WORK

The mission equipment data base shall contain overhaul and repair requirements, overhaul and repair planning data, constraints, and completion status.

3.8 FLIGHT-SPECIFIC CONFIGURATION

The mission equipment data base shall contain specific part installation/removal/reinstallation requirements and status (at the launch/landing or pre-pack site installation/removal level), including the status of EO/DCN incorporation. Installation/removal/reinstallation data shall include identification of work authorization documents which govern the activity and constitute the primary verification records, as well as installed, removed part numbers, serial numbers, quantities, and verification dates.

3.8.1 Mission Equipment End Item Configuration

The agency responsible for the design of each mission equipment end item also shall be responsible for maintaining the configuration of that end item in accordance with NSTS 07700, Volume IV - Book 1, Paragraphs 5.4 and 6.2.

3.9 FLIGHT-PECULIAR TEST AND VERIFICATION REQUIREMENTS

The mission equipment data base shall include reference to flight-peculiar OMRSD requirements related to mission equipment refurbishment/checkout/installation.

3.10 FSE PROJECT SUPPORT

The mission equipment data base shall include engineering release data for FSE and stowage drawings. It shall also include such local asset control and operations planning data as may be required to support the pre-pack, refurbishment and overhaul and repair activities.

3.11 LAUNCH SITE OPERATIONS SUPPORT

The mission equipment data base shall include the capability to track and provide status reports of launch site records of mission equipment installation/removals and approved mission equipment modifications. The mission equipment data base will be updated to reflect asset tracking location, launch site Open Work status, landing site Open Work status, and mission equipment installation/removal records.

4.0 MISSION EQUIPMENT DATA BASE MAINTENANCE REQUIREMENTS

4.1 FILE UPDATE CAPABILITY

Mission equipment data base updating shall be accomplished from remote terminals located at the site at which primary engineering, planning, or installation activity is performed.

4.2 DATA COLLECTION/FILE UPDATE RESPONSIBILITY

The mission equipment data collection process is shown in Figures R-1, R-2, and R-3. File updating shall be accomplished by the agency responsible for installation planning, design, or accomplishment, as set forth in Table R.1.

5.0 MISSION EQUIPMENT REPORTING REQUIREMENTS

Data contained in the data base shall be accessible by screen display/hard copy at remote terminals. Report availability is described in Table R.2.

6.0 SYSTEM OPERATION

The SFOC contractor shall be responsible for mission equipment accounting system operation support.

6.1 FILE INTEGRITY

The MECAS design shall incorporate file maintenance controls which will minimize the possibility of data deletion/modification by unauthorized personnel. It also shall provide a system of edits which will, to the degree which is practical and cost effective, bring erroneous, contradictory or illogical data to the attention of those responsible for the affected data subset.

7.0 FORMAL REPORTING

The MECAS shall produce selected reports to support tracking and accounting of mission equipment hardware. The MECAS will be capable of providing on-line and batch reports that include the following:

- a. Mission equipment assets by location
- b. Mission equipment flight allocation
- c. Mission equipment Open Work status by flight
- d. Mission equipment installation status by flight

TABLE R.1

MISSION EQUIPMENT DATA BASE MAINTENANCE RESPONSIBILITY

ACCOUNTING SUBSYSTEM	ORBITER FLIGHT KITS	PAYLOAD INTEGRATION FLIGHT KITS	STOWAGE PROVISIONS	FLIGHT SUPPORT EQUIPMENT
1. Asset Tracking Requirement Delivery Status Location	HSF&E Huntington Beach HSF&E Huntington Beach Launch Site	HSF&E Huntington Beach HSF&E Huntington Beach Launch Site	JSC JSC JSC	JSC JSC JSC
2. Asset Utilization	JSC (P) HSF&E Huntington Beach (S)	JSC (P) HSF&E Huntington Beach (S)	JSC (P) HSF&E Huntington Beach (S)	JSC
3. Pre-Pack Open Work Design Requirements Work Auth/Constraint Completion Status	JSC JSC JSC	JSC JSC JSC	JSC JSC JSC	JSC JSC JSC
4. Launch Site Open Work Instl/Removal Reqts Mod Requirements Work Auth/Constraint Completion Status	HSF&E Huntington Beach HSF&E Huntington Beach Launch Site Launch Site	HSF&E Huntington Beach HSF&E Huntington Beach Launch Site Launch Site	JSC JSC Launch Site Launch Site	JSC JSC Launch Site Launch Site
5. Landing Site Open Work Instl/Removal Reqts Work Authorization Completion Status	HSF&E Huntington Beach Launch Site Launch Site	HSF&E Huntington Beach Launch Site Launch Site		JSC JSC JSC
6. Overhaul and Repair (O&R) Reqts/Constraints Completion Status	Launch Site O&R Facility	Launch Site O&R Facility		

TABLE R.1

MISSION EQUIPMENT DATA BASE MAINTENANCE RESPONSIBILITY - Concluded

ACCOUNTING SUBSYSTEM	ORBITER FLIGHT KITS	PAYLOAD INTEGRATION FLIGHT KITS	STOWAGE PROVISIONS	FLIGHT SUPPORT EQUIPMENT
7. Flight Configuration Design Reqts Pre-Pack Records Instl/Removal Records	HSF&E Huntington Beach JSC Launch Site Launch Site	HSF&E Huntington Beach JSC Launch Site Launch Site	JSC JSC Launch Site Launch Site	JSC JSC Launch Site
8. Test and Verification OMRSD Recap Test Records	HSF&E Huntington Beach Launch Site	HSF&E Huntington Beach Launch Site	N/A N/A	JSC Launch Site (P) JSC (S)

LEGEND - (P) = Primary (S) = Support

TABLE R.2
MISSION EQUIPMENT ACCOUNTING SYSTEM
REPORTING REQUIREMENT

ACCOUNTING SUBSYSTEM	DESCRIPTION	ON-LINE SCREEN DISPLAY/HARD COPY	BATCH REPORTS
1. Asset Tracking	Mission equipment list, delivery requirements, and status	Item description/status	Mission equipment catalog hardware location and status
2. Asset Utilization	Mission equipment actual/projected utilization Stowage provisions actual/projected utilization Ferry kit actual/projected utilization	Item allocation/incremental installations Item utilization Item utilization	Mission equipment flight allocation/flight manifest Stowage provisions utilization Ferry kit hardware utilization
3. Pre-pack Open Work	Pre-pack requirements and status	Item pre-pack requirement/status	Pre-pack Open Work status Pre-pack work author document
4. Launch Site Open Work	Launch site installation and modification requirements and status	Item installation/removal modification kit/EO status	Launch site Open Work status
5. Landing Site Open Work	Landing site requirements and status	Item installation/removal status	Landing site Open Work status
6. O&R Open Work	O&R requirements and status	Item repair status	O&R facility Open Work status
7. Flight Configuration	a. Mission equipment and item configuration b. Launch configuration c. Ferry configuration	Item drawing status Applicable EO/DCN Applicable modification kits Applicable nonconformance documents	Mission equipment as-installed configuration

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FIGURE R-1

MISSION EQUIPMENT CONFIGURATION VERIFICATION ACCOUNTING

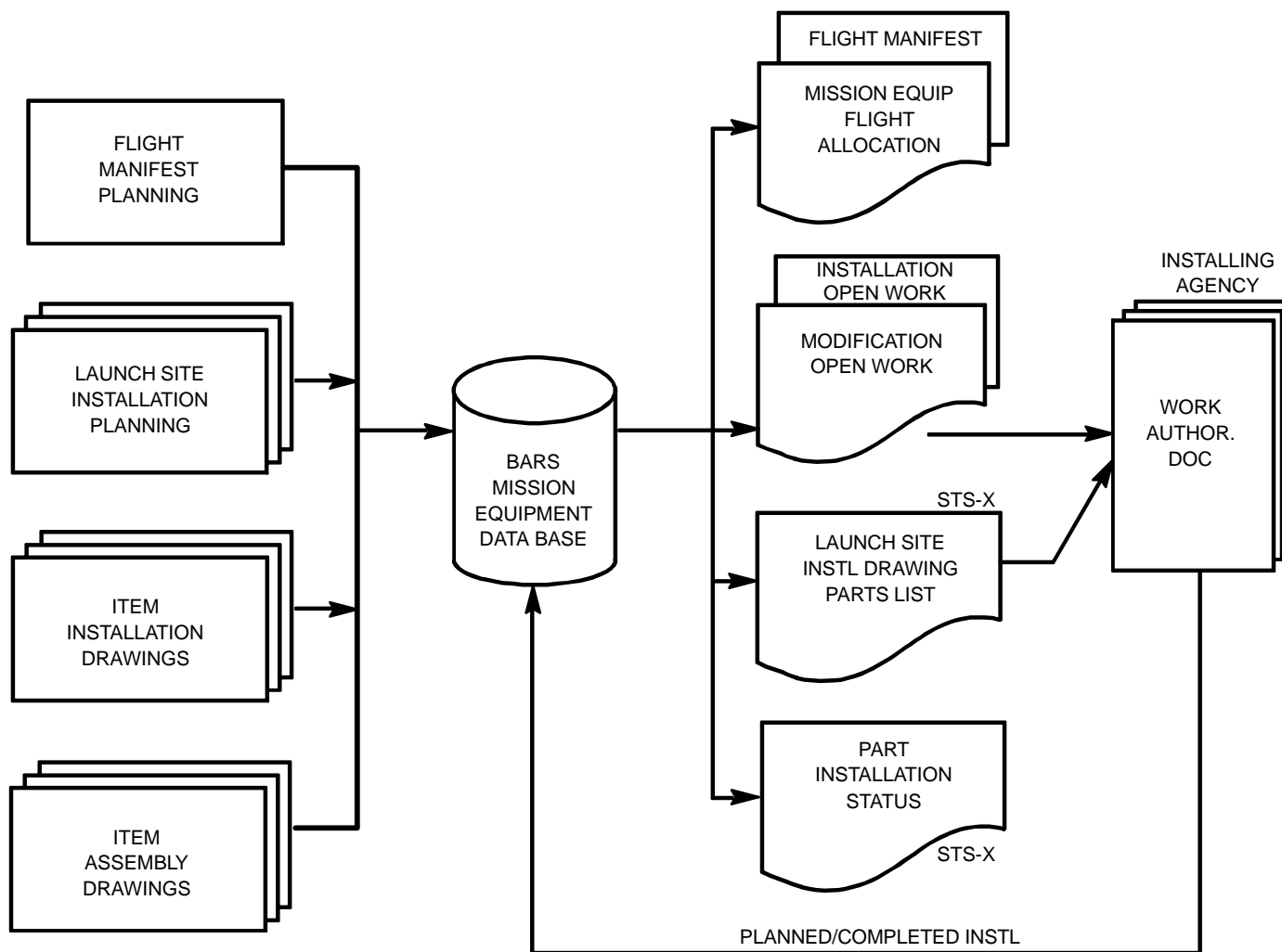


FIGURE R-2

FLIGHT KIT CONFIGURATION VERIFICATION ACCOUNTING

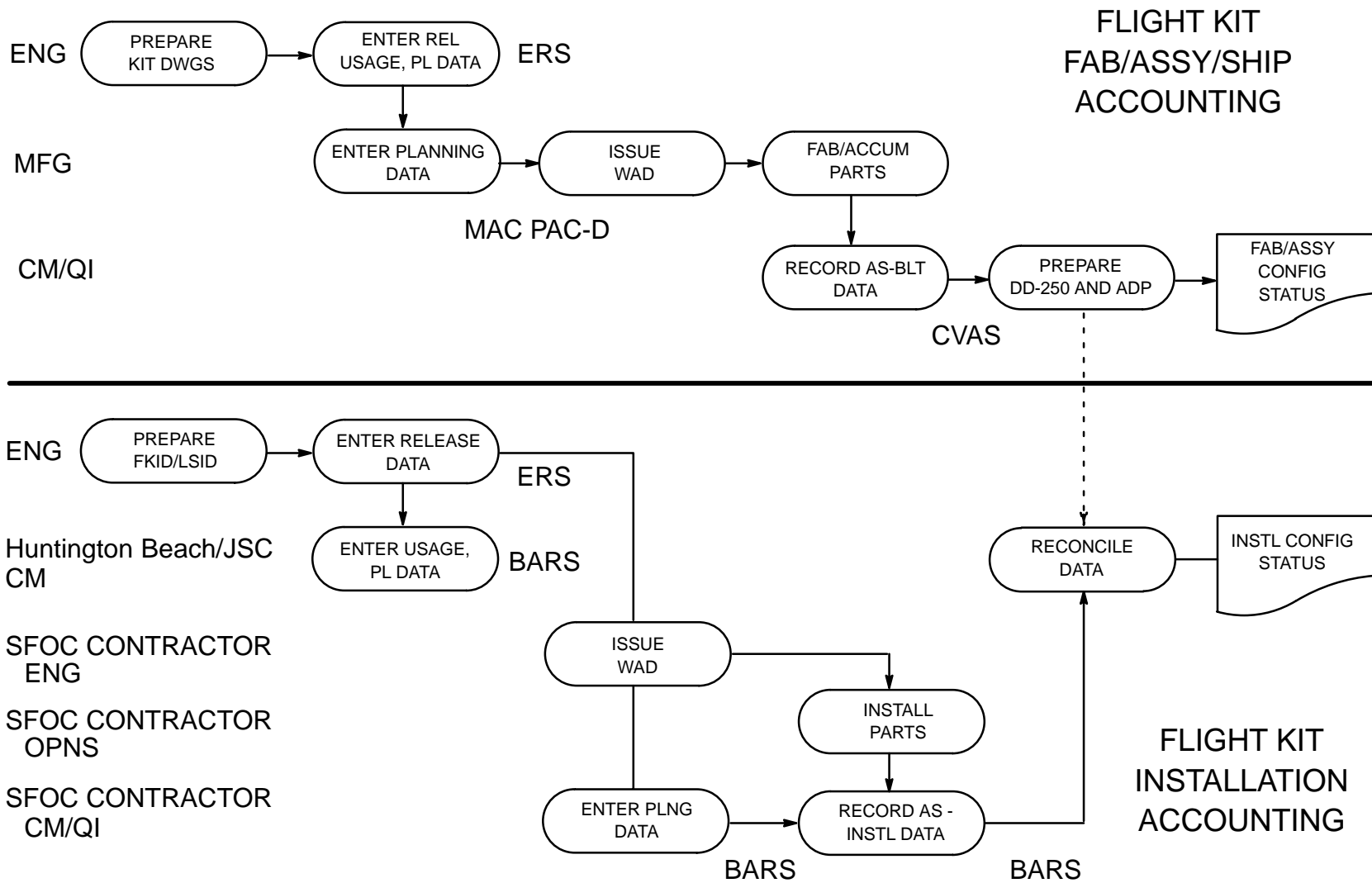
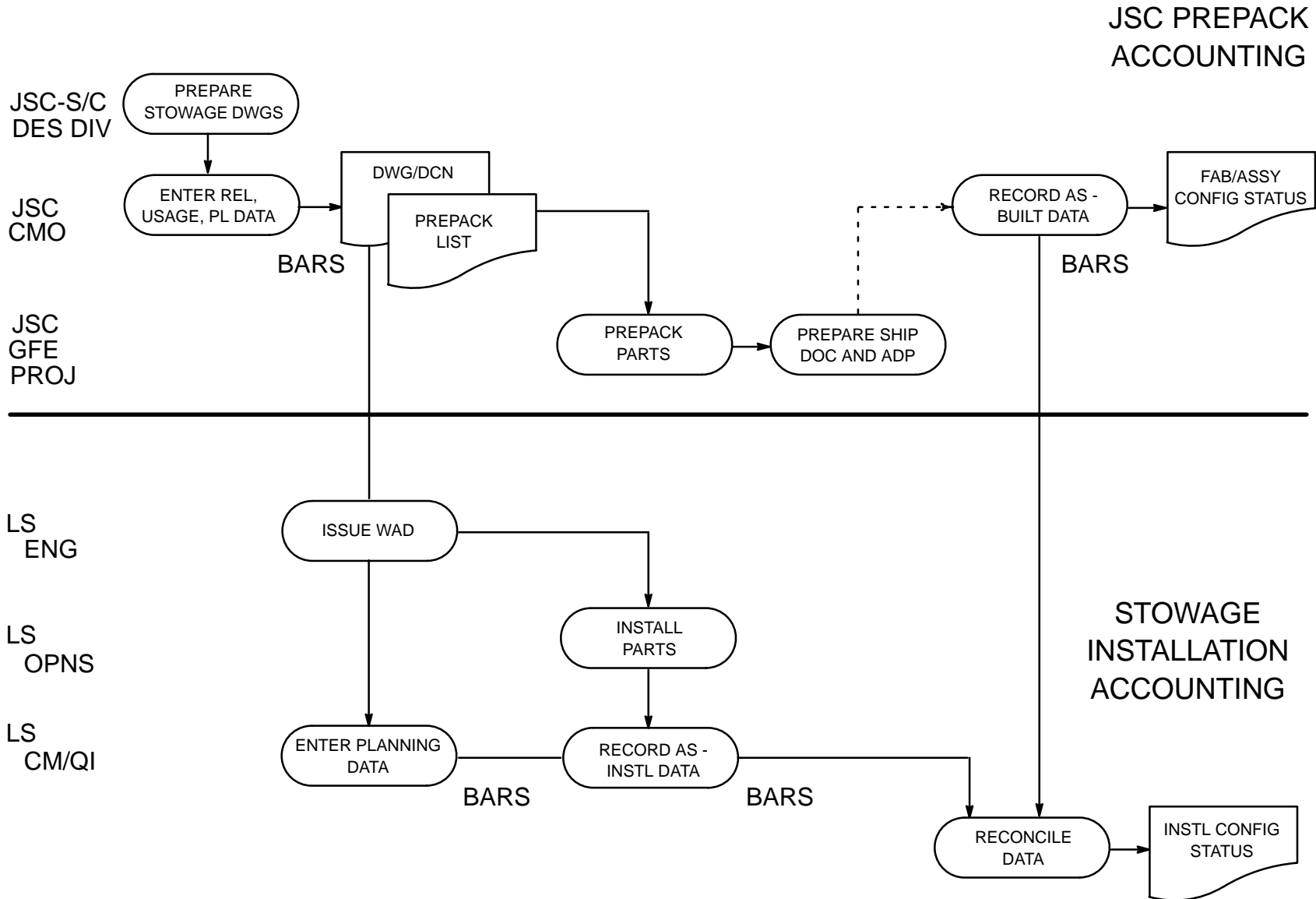


FIGURE R-3
STOWED ITEMS CONFIGURATION ACCOUNTING



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APPENDIX V

SHUTTLE FLOW WORK INTEGRATION

PROCESS, DOCUMENTATION, AND TRACKING REQUIREMENTS

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APPENDIX V

SHUTTLE FLOW WORK INTEGRATION PROCESS, DOCUMENTATION, AND TRACKING REQUIREMENTS

1.0 PURPOSE

This appendix defines the requirements and responsibilities for imposing work on the launch site during Space Shuttle turnaround flows, and defines the system for coordinating, baselining, documenting, and tracking this work.

2.0 SCOPE

The work requirements covered by this appendix are flight element hardware modifications; mission equipment manifest installations, including required hardware modifications; and nonstandard work related to a turnaround flow. This appendix is applicable to all SSP organizational elements and their associated contractors who are responsible for coordinating, baselining, and tracking launch site flow work requirements. Work requirements related to flight software, GSE and OMRS, are not included in this appendix.

3.0 RESPONSIBILITIES

All work requirements to be placed on the launch site during Space Shuttle turnaround flows require SSP approval prior to implementation. Approved work that cannot be accomplished during a given flow requires SSP approval for deferral prior to key processing milestones identified as a constraint to work completion.

At the LSRR, which is held approximately eight weeks prior to Orbiter roll-in from the previous mission/Palmdale OMDP, all mission-specific OMRS, time and cycle actions, manifest engineering, element hardware/software modifications, nonstandard work (chits, etc.), and engineering to be completed during the launch site flow are baselined by Space Shuttle PRCBD.

At the LSFR, which is held approximately four weeks prior to Orbiter roll-in from the previous mission/Palmdale OMDP, all work requirements will be statused and baselined by Space Shuttle PRCBD. This baseline establishes the launch site flow freeze point, after which only mandatory changes, i.e., those necessary to ensure crew/vehicle safety and/or accomplish a primary mission objective, will be authorized.

A delta LSFR shall be conducted to rebaseline work requirements when deemed necessary by the Manager, Space Shuttle Program as required by Paragraph 4.4.14.4, delta LSFR, this document.

All flow-related work will be identified in the SSP MRCS data base and maintained current.

The Space Shuttle Flow Work Integration Process, Documentation, and Tracking Requirements process as described in this appendix is the responsibility of the Manager, Space Shuttle KSC Integration.

Roles and responsibilities for accomplishing these functions are addressed in the subordinate paragraphs.

3.1 FLIGHT ELEMENT HARDWARE MODIFICATIONS

Prior to the beginning of each Space Shuttle turnaround flow, each SSP element/project will review the outstanding and proposed modifications and assign an STS/flight set/tail number effectivity to all modifications within its area of responsibility. A listing of all modifications that are candidates for implementation during the turnaround flow will be coordinated and reviewed with the launch site and the Space Shuttle project design contractors. Project Office responsibilities for these requirements are as follows:

- a. Orbiter Modifications: The Space Shuttle Vehicle Engineering Office's coordination of Orbiter modifications will be carried out through regularly scheduled telecons and meetings. A modification baseline that covers the next three flights of any vehicle as a minimum and the releasing of modifications for design with a "change point" that is fully coordinated with and accepted by the launch site are goals.
- b. SSME, ET, RSRM and SRB Modifications: The MSFC project offices are responsible for coordinating all MSFC flight element post-delivery modifications, as they are identified, with the launch site and the design contractors.

Subsequent to review and approval by the SSP elements/projects, these modifications including any scheduled modifications which violate the element design control parameter(s) limits for the ISS mission specified in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1, will be presented as an LSRR or LSFR agenda item to the Space Shuttle PRCB or to the Special Daily PRCB if after delta LSFR, and baselined via PRCBD for implementation on a given Space Shuttle turnaround flow. Each modification presented will be accompanied by the appropriate launch site need dates and design contractors' commitment dates for engineering and hardware delivery. The launch site will be required to commit the necessary resources and schedule time for implementation of modifications when they are presented to the Space Shuttle PRCB for approval. Opportunity modifications will not be baselined for the turnaround flow unless the TCTIs and engineering are released by LSRR, and the hardware is delivered to the launch site by one week after the LSFR. Space Shuttle Vehicle Engineering is excepted from the requirement to provide TCTIs for hardware changes.

At the LSFR, each modification previously approved for the turnaround flow and any additions or deletions to the SSP baseline previously established, including the need and commitment dates as described above, will be reviewed. The SSP baseline, including the need and commitment dates, will be maintained in the SSP MRCS data base.

3.2 MISSION EQUIPMENT MODIFICATIONS AND INSTALLATION

Mission equipment manifest requirements for each mission are defined on the cargo arrangement drawing which are initially released and included in the Cargo Integration Review (CIR) data package approximately 30 days prior to the CIR. Responsibilities for these requirements, as specified in Section 7.0 of this document, are as follows:

- a. (Deleted)
- b. Space Shuttle Systems Integration Office at JSC: SSV element capability extension and cargo/interface installation as documented by the MECSLSI drawing.
- c. Space Shuttle Vehicle Engineering Office: Flight crew equipment as documented by the CCCD.
- d. EVA Project: EVA equipment installation as documented by the MECSLSI drawing and the CCCD.

Mission configuration, including required hardware modifications, and the associated reference drawings (i.e., cargo arrangement, integrated schematic, and interface diagram) will be baselined at the CIR. The MECSLSI drawing is released in the Final Reconfiguration Engineering Drawing (FRED) datapack approximately 60 days after CIR. The CCCD is released separately from the FRED approximately 60 days after CIR.

The control authority for changes to delegated mission integration requirements is the ICB (reference Paragraph 4.3.2.2 in this document). Post-Delta LSFR changes noted in ICB Paragraph 4.3.2.2.1c or changes affecting other SSP requirements, budgets or schedules controlled by the Manager, Space Shuttle Program will be forwarded to the Space Shuttle PRCB for disposition. Changes which violate the element design control parameter(s) limits for the ISS mission specified in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1, shall also be authorized by the PRCB.

At the LSFR, the manifest drawing release and mission equipment and modification kit delivery status and assessment will be presented. Each mission equipment modification presented will be accompanied by the appropriate launch site need dates and design contractors' commitment dates for engineering and hardware delivery. The

launch site will be required to commit the necessary resources and schedule time for implementation of modifications when they are presented to the Space Shuttle PRCB for approval.

Mission equipment manifest installation requirements, including required hardware modifications, will be identified and tracked in the SSP MRCS data base for each flow. The data base will list the TO drawings specified on the MECSLSI and CCCD drawings with applicable EOs and modification drawings with the applicable EOs. The MRCS data base will be used to verify the incorporation of the requirements listed on the TO/ installation/modification drawings, including JSC GFE drawings with SGD and SJD prefixes that are authorized by these released drawings.

3.3 NONSTANDARD WORK

After coordination with the SFOC Ground Operations ADM, nonstandard work requirements which require SSP authorization as described in Paragraph 4.4.13.7a, will normally be submitted to the Special Daily PRCB on a CR or chit. A SPAR may also be used to submit emergency cannibalization changes to the Special Daily Space Shuttle PRCB, as described in Paragraph 4.4.13.8a. Each approved flow-related requirement will be tracked in the MRCS data base as part of the Space Shuttle turnaround baseline.

Shuttle Vehicle program elements/projects are responsible for the coordination and presentation of nonstandard work requirements.

3.4 LAUNCH SITE IMPLEMENTATION

All flight element hardware modifications; mission equipment manifest installations, including required hardware modifications; and nonstandard work baselined by the Space Shuttle PRCB or delegated project for a Space Shuttle turnaround flow will be implemented prior to launch. In the event that these requirements cannot be accomplished for the specified flow, they shall be presented to the authorizing program/project for deletion or deferral per the deferral process described in Paragraph 3.5 prior to the key processing milestone that is identified as a constraint for completion of the work.

Technical Operating Procedures (TOPs) (e.g., Work Authorization Documents [WADs]) will be generated to implement each requirement. These TOPs will be entered and statused in the MRCS data base.

The SSP baseline requirements will be reviewed and specifically addressed during the incremental program milestone review and in the Flight Readiness Review CoFR endorsement. Open/incomplete work shall be described and rationale for processing beyond the milestone with open requirements will be presented to the review board. MRCS data base reports will be available to assist in this review.

3.5 DEFERRALS

Authorized flight element hardware modifications, mission equipment installations/modifications, and nonstandard work that cannot be accomplished during a given flow requires SSP or delegated approval for deferral (reference Paragraph 4.2). The Space Flight Operations Contractor should process the appropriate request for deferral authorization, e.g., CR or SPAR. The requirements records in MRCS will be updated to reflect approved deferrals.

3.5.1 Orbiter/Mission Equipment Deferrals

Orbiter-related deferred work will be analyzed and a deferral request will be initiated on a PAR. The PAR submittal will contain an analysis of all EOs and drawing requirements that must be deferred and, in the case of a partial deferral, will provide the specific parts that were not installed. The requirement record in MRCS will be updated to reflect the PAR number for reference only on SSP approved deferrals.

3.5.2 SSME, ET, and SRB Deferrals

For SSME, ET, and SRB deferred work, the MSFC Resident Office will coordinate the deferral request with the appropriate MSFC project office and design contractor. When concurrences have been obtained to defer the authorized change, the request must be submitted to the Space Shuttle PRCB or delegated project for approval. The MRCS data base will be updated to reflect approved deferrals.

3.6 MRCS DATA BASE MAINTENANCE

The MRCS data base shall be maintained to contain a current and accurate SSP baseline list of flight element hardware modifications, including all site need dates and contractor commitment dates for engineering and hardware delivery; mission equipment manifest installations, including required hardware modifications; and all approved non-standard work requirements. Each SSP element/project will support this effort as required to maintain an accurate up-to-date baseline list.

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APPENDIX X

SPACE SHUTTLE MAIN ENGINE SOFTWARE CHANGE PROCEDURES

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APPENDIX X

SPACE SHUTTLE MAIN ENGINE SOFTWARE CHANGE PROCEDURES

1.0 PURPOSE

The purpose of this appendix is to establish detailed procedures for processing Criticality 1 and 1R software baselines and changes thereto.

2.0 SCOPE

The procedures as established by this appendix, are applicable to the Block II Space Shuttle Main Engine Controller (SSMEC) software.

3.0 RESPONSIBILITIES

The Space Shuttle Main Engine Software change process as described in this appendix is the responsibility of the Manager, Space Shuttle Vehicle Engineering (Software and Avionics).

4.0 SPACE SHUTTLE MAIN ENGINE PROJECT

MSFC shall forward a copy of all preliminary Block II RCNs to the SASCB (via a designated recipient). A preliminary RCN is constituted by the earliest version of a RCN which defines the proposed changes to the software requirements (also known as "Part I Specifications").

MSFC shall coordinate with JSC to select which preliminary RCNs are appropriate for SASCB review. Selection shall consist of those RCNs intended for vehicle installation at the launch site. Such RCNs shall be scheduled for a SASCB date, to be coordinated between JSC and the MSFC member of the SASCB.

MSFC shall provide briefing charts and verbal presentations to the SASCB for scheduled RCNs. Presentations shall include a preliminary recommendation of the RCNs release effectivity.

SASCB dispositions of a preliminary RCN shall be limited to:

- a. Deferring the RCN to a future SASCB;
- b. A finding of concurrence with the MSFC preliminary recommendation; or
- c. A finding of nonconcurrence with the MSFC preliminary recommendation.

No dispositions shall be indicated on the RCN form. The official disposition record shall be constituted by the SASCB minutes.

SASCB dispositions of preliminary RCNs (as described and limited by the above paragraph) shall not be a constraint to software design, code, or test. The purpose of such disposition is to identify issues which, if unresolved, could become constraints to SASCB release approval of SSMEC software.

MSFC shall prepare and submit to the Space Shuttle Avionics Office and SSMEC a software release content CR for each SSMEC software release intended for vehicle installation at the launch site. Such CRs shall identify a previously released base software version and all RCNs which constitute a difference between the base version and the version (or version update) to be released. SASCB approval of a release content CR shall be a constraint to implementing the applicable release on a Shuttle Vehicle.

MSFC shall submit SSME software release content CRs in time to support an adequate SASCB review and approval without impacting KSC installation schedules.

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**PROGRAM MATERIAL REVIEW BOARD PROCEDURES
AND GUIDELINES**

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APPENDIX Z

PROGRAM MATERIAL REVIEW BOARD PROCEDURES AND GUIDELINES

1.0 PURPOSE

The purpose of this appendix is to define PMRB procedures and to establish guidelines to be followed in determining the level of approval required for flight hardware nonconformances occurring during Space Shuttle vehicle processing which invalidate the SSP flight configuration baseline (i.e., as-designed vs. as-built). Flight hardware covered by these guidelines includes assemblies and parts down to, and including, attaching hardware.

2.0 DEFINITIONS

MR - Indicating an association with the material review process.

MRB - A project level material review board (reference NSTS 5300.4(1D-2)).

PMRB - The Program Material Review Board (reference Paragraph 4.3.2.9).

Design released part - A part described and authorized by released engineering.

MR Part - A unique detail part designed and fabricated to effect a MR repair to a designed part. It can be doubler, stiffener, shim, bushing, patch, sleeve, section of tubing or duct, etc., and is normally identified with the MR document number by which it was designed and fabricated.

Substitute Part - A part, identified by a different part number, which is utilized as a substitute for the part designed for a particular application. Substitute parts may be fabricated by an MR document specifically for the substitute application, or designed and fabricated originally for utilization elsewhere.

Alternate Part - A part which is different in part number or dash number from the specified hardware, and meets one of the criteria specified in Paragraph 4.0c of this appendix.

3.0 RESPONSIBILITIES

The Space Shuttle PMRB process as described in this appendix is the responsibility of the Manager, Space Shuttle KSC Integration.

4.0 PMRB PROCEDURES

- a. PMRB Meetings: Meetings of the PMRB will be held on a schedule to be determined by the Chair. Dates and agendas will be transmitted to all members prior

to a meeting and shall be made electronically available to all SSP engineering organizations.

- b. PMRB Dispositions: PMRB dispositions shall be documented in a standard format to be defined by the Chair. Dispositions shall be published and disseminated in hard copy to the PMRB members and entered into the Program Compliance Assurance and Status System (PCASS) for program wide access. The PCASS system will enable realtime program/project awareness of dispositions and rationale. Content of PMRB dispositions will include:
 - 1. Description, part number, and serial number of discrepant hardware
 - 2. Criticality of discrepant hardware
 - 3. OMRSD requirement (if applicable)
 - 4. Rationale for acceptability for flight
 - 5. Statement of restriction or deferred work
 - 6. Statement of impact/no impact on CIL retention rationale or hazard controls
 - 7. Statement of impact/no impact on certification and associated rationale
 - 8. Item reference numbers from corrective action tracking systems. (To be added to the electronic record of the PMRB disposition as they become available)
 - 9. Concurrences from PMRB members
 - 10. Actions assigned and due dates/milestones
- c. PMRB Action Closeout: The Chair is responsible for the recording, tracking, and timely closeout of all actions assigned. The action should include due dates and milestones. Corrective action requests will be tracked in the CAAR/ CAR system. The Chair will maintain a log of open and closed actions for review of status.
- d. For all deferred nonconformances affecting baselined modifications, the PMRB will initiate a CAR within two working days of approval. The CAR will be forwarded to the OPR, the Program Configuration and Data Requirements Office (MK-SIO-1), KSC. The Deputy Manager, Systems Integration, KSC, will be the authorizing signature for the CAR.
- e. Nonconformances which have been dispositioned and approved by the PMRB shall not require the generation of a configuration waiver.

5.0 GUIDELINES

- a. General: In the following paragraphs specific categories of material review dispositions are discussed, including restricted installation or restricted life use of the discrepant hardware by the PMRB to a vehicle, flow event, interval or location.
- b. Substitution of Parts: An MRB disposition shall not normally be used to authorize the substitution of an unauthorized part for the part prescribed for a particular application by released engineering. There are however limited situations where substitution may be authorized by PMRB action as follows:
 - 1. Where a design released part is not available or does not fit or function properly because of previous MR action, tolerance buildup, mislocated components, or in the event of design error which requires an interim work-around prior to finalizing long-term corrective engineering, a PMRB substitute part may be designed and fabricated on a Problem Report (PR), and identified with the MR document number. The substitute part must be approved for restricted installation to a specified vehicle or location. If applicable, the disposition should also specify restricted life use limitations.
 - 2. When a design released part for a particular application is inadvertently replaced by a part designed and released for utilization elsewhere, the utilization of this part must be identified on an MR document, as in Item 1 above.
- c. Utilization of Alternate Parts: Some MRB dispositions that are required to correct a documented hardware discrepancy result in the use of alternate parts. In these circumstances the baseline configuration is not considered to be changed. Definition of alternate parts is limited to the following cases. MRB approval is required for Items 1 through 5. PMRB approval is required for Items 6, 7 and all other cases.
 - 1. Replacement of a fastener with one of a larger diameter when salvaging a hole that has been drilled oversize to correct for misdrilling, ovality, bore damage, or a similar defect.
 - 2. Replacement of a fastener by a blind fastener when access does not permit installation of the original type because of manufacturing assembly sequencing.
 - 3. Replacement of a protruding head rivet with a countersunk rivet when hole spacing variances cause rivet head interferences with required parts installation.

4. Replacement of a fastener/clamp with one of a larger or smaller size to meet limitations with respect to threads in bearing, grip length, effecting clamping, etc., providing the discrepancy is not a generic one that requires corrective engineering.
 5. Project certified repairs of TPS materials specified on ET and SRB drawings and specifications with project approved alternate materials.
 6. Use of an SSP element contractor standard part number (bolt, rivet, clamp, etc.) to replace a vendor standard part if the vendor part is not available, provided that the element contractor part is functionally and physically equal or superior.
 7. Use of an SSP element contractor process specification in lieu of a vendor/subcontractor specification (adhesive bonding, crimping, finishes, etc.) if the vendor specification requires materials, special tools/facilities, or certification skills that are not available, provided that the element contractor specification is functionally and physically equal or superior.
- d. Interchangeability: An MRB shall not normally authorize a change to a part that precludes its interchangeability (fit and function). In the event that this is the only option available, the PMRB may authorize the action for restricted installation to a specified vehicle or location. If applicable, the disposition should also specify restricted life use limitations. Any action that precludes subsequent replacement of an interchangeable LRU must be approved by the PRCB.
 - e. Engineering Drawing or Drawing Invoked Specification Noncompliance: An MRB disposition shall not normally be used to pre-approve noncompliance with a drawing or drawing invoked functional or process specification. Should a requirement exist, however, prior PMRB approval is required when the process involves functional Criticality 1 or 2 hardware.
 - f. Part Deletion: An MRB may not normally authorize the deletion or incomplete installation of a part. In limited cases, after technical evaluation of the condition, the PMRB may approve the condition for restricted installation to a specified vehicle or location. If applicable, the disposition should also specify restricted life use limitations.
 - g. Design Error Correction: An MRB disposition may not normally be utilized to correct a design error. Corrective engineering must be requested. In limited cases where released engineering cannot be implemented as designed, and redesign for a long-term installation is required, the PMRB may authorize an interim action restricted to vehicle, flow, event, interval or location until the corrected design is ready for incorporation.

- h. Rework of Good Parts to Fit Bad Parts: An MRB action shall not normally authorize the repair of a good part to fit a bad part. There may exist, however, circumstances where the PMRB may conclude that an evaluation of cost and time supports such an action. Depending on the nature of the interim action (see Subparagraphs a through e above) restriction of the hardware may or may not be required.
- i. Any disposition that violates element design control parameter(s) limits for the ISS mission specified in NSTS 07700, Volume X - Book 1, Paragraph 3.1.3.1.

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